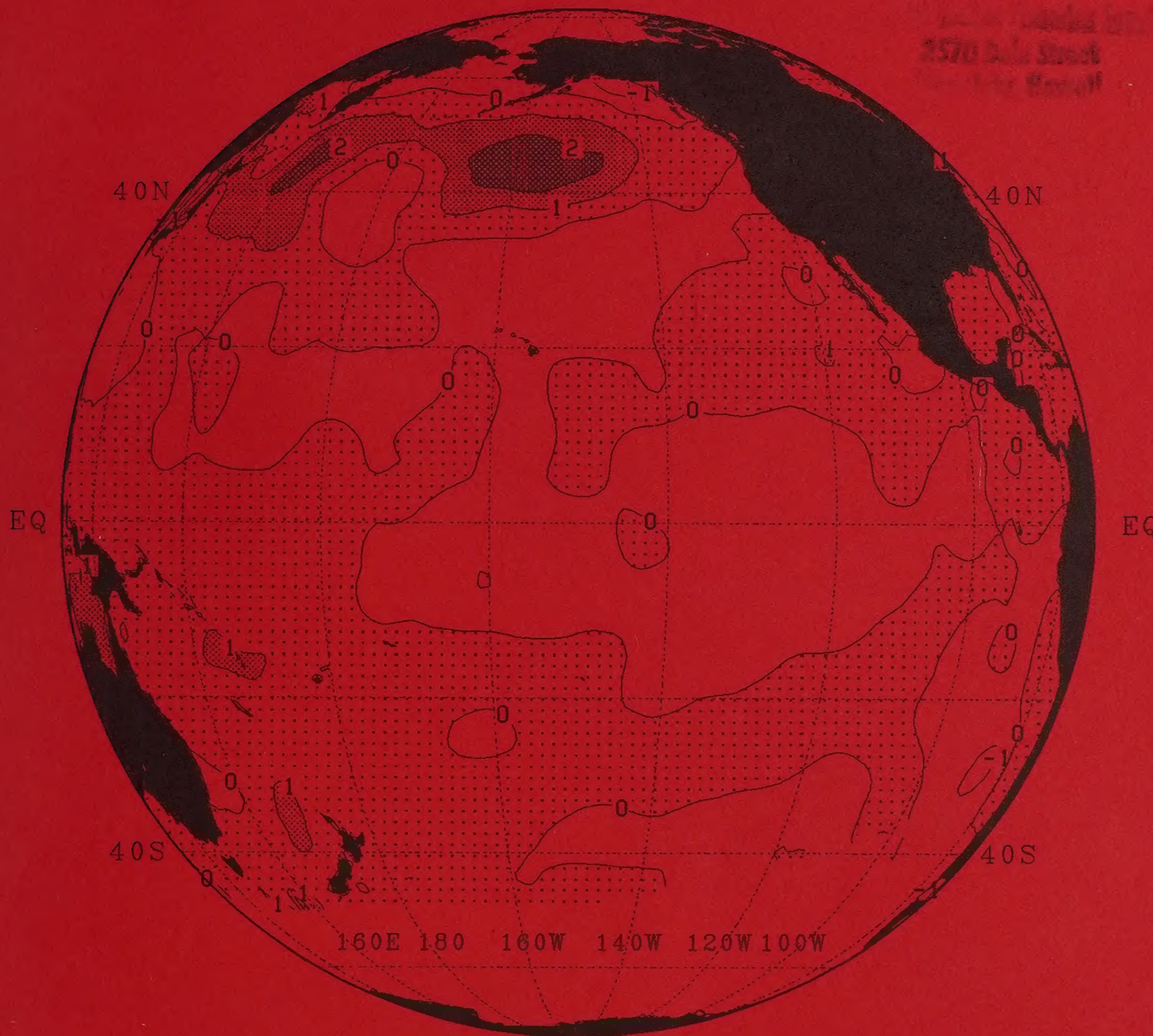
気象庁海洋月報

Monthly Ocean Report
September 2000 (No. 93)



Climate and Marine Department

Japan Meteorological Agency

気象庁 気候・海洋気象部

平成12年9月

気象庁海洋月報は、気象庁 気候・海洋気象部 海洋課で作成しています。
本月報に関する問い合わせは、
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表紙は、2000 年 9 月の太平洋の月平均海面水温偏差図です。
陰影部は、平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for September 2000 in the Pacific Ocean.
Areas of positive anomalies are shaded.

Table of Contents

Figure Page

Highlights [illegible]

Oceanographic conditions in the western North Pacific Ocean and seas adjacent to Japan

Conditions for this month

Sea Surface Temperature (SST)

Ten-day mean SST and anomalies in the western North Pacific

Monthly mean SST and anomalies in the western North Pacific

Subsurface Temperature

Subsurface temperatures at the depths of 100 m, 200 m and 400 m in seas adjacent to Japan

Ocean Current and Sea Surface Heights

Sea surface current in the western North Pacific

Location of the Kuroshio axis

Sea surface dynamic heights in the western North Pacific

Sea surface current vectors in the western North Pacific

Seasonal variations

Sea Surface Temperature

Time series of ten-day mean SST anomalies in the western North Pacific

Time series of coastal water temperatures along the coasts of Japan

Sea Level

Time series of sea level and its anomalies along the coasts of Japan

Ocean Data Buoy Observations

Oceanographic conditions in the global and Pacific Ocean

Conditions for this month

Monthly mean SST and anomalies in the global ocean

Subsurface temperatures at the depths of 100 m, 200 m and 400 m in the Pacific Ocean

Movement of drifting buoys in the Pacific Ocean

Depth-longitude sections of temperature and anomalies along the equator in the Pacific Ocean

Monthly sea level anomalies in the Pacific Ocean

Monthly sea surface height anomalies in the global ocean

Long-term variations

SST in the Global Ocean

Long-term variations of monthly mean SST anomalies

Equatorial Pacific

Time series of SST anomalies in the equatorial Pacific Ocean

El Niño monitoring indices

Time-longitude sections [illegible]

Time-longitude sections of [illegible] along the equator in the Pacific Ocean

Zonal-depth sections of [illegible] Pacific subsurface temperature

Others

[illegible]

Oceanographic observations by research vessels of JMA

Geographical locations of [illegible]

目　次

	図	ページ
海況の特徴（2000 年 9 月）		1
北西太平洋及び日本近海の今月の海況		
海面水温		
北西太平洋旬平均海面水温図及び偏差図（上旬、中旬、下旬）	1-3	2-4
北西太平洋月平均海面水温図及び偏差図	4	5
表層水温		
日本近海表層水温図（深さ 100 m、200 m、400 m）	5-7	6-8
海流・海面高度		
北西太平洋海流図	8	9
旬別黒潮流軸図	9	10
北西太平洋力学的海面高度分布図	10	11
北西太平洋海流ベクトル図	11	11
北西太平洋及び日本近海の海況の推移		
海面水温		
海域別旬平均海面水温平年偏差時系列図	12	12-13
沿岸水温時系列図	13	14
潮　位		
沿岸潮位時系列図	14	15-16
海洋気象ブイロボット	15	17-19
全球及び太平洋の今月の海況		
全球月平均海面水温図及び偏差図	16	20
太平洋表層水温図（深さ 100 m、200 m、400 m）	17-19	21-22
太平洋ブイ流跡図	20	22
太平洋赤道に沿う表層水温及び偏差の深度－経度断面図	21	23
太平洋月平均海面水位偏差図（2000 年 8 月）	22	24
全球月平均海面高度偏差図（2000 年 8 月）	23	24
全球及び太平洋の海況の推移		
海域平均海面水温偏差の長期変動	24	25
太平洋赤道域の海面水温偏差時系列図	25	26
エルニーニョ監視指数	第 1 表	27
赤道に沿った海面水温及び偏差の時間－経度断面図	26	28
太平洋の赤道に沿う海洋表層の貯熱量及び偏差の時間－経度断面図	27	29
太平洋赤道域の表層水温の時間－深度断面図	28	30
その他		
海　氷	29	31
海洋気象観測船による海洋観測結果	30	32
測点分布図	31	33-34

Table of Contents

	Figure	Page
Highlights (September 2000)		1
Oceanographic conditions in the western North Pacific Ocean and seas adjacent to Japan		
Conditions for this month		
Sea Surface Temperature (SST)		
Ten-day mean SST and anomalies in the western North Pacific	1-3	2-4
Monthly mean SST and anomalies in the western North Pacific	4	5
Subsurface Temperature		
Subsurface temperature at the depths of 100 m, 200 m and 400 m in seas adjacent to Japan	5-7	6-8
Ocean Current and Sea Surface Heights		
Sea surface current in the western North Pacific	8	9
Location of the Kuroshio axis	9	10
Sea surface dynamic heights in the western North Pacific	10	11
Sea surface current vectors in the western North Pacific	11	11
Temporal variations		
Sea Surface Temperature		
Time series of ten-day mean SST anomalies in the western North Pacific	12	12-13
Time series of coastal water temperatures along the coasts of Japan	13	14
Sea Level		
Time series of sea level and its anomalies along the coasts of Japan	14	15-16
Ocean Data Buoy Observations	15	17-19
Oceanographic conditions in the global and Pacific Ocean		
Conditions for this month		
Monthly mean SST and anomalies in the global ocean	16	20
Subsurface temperature (at the depths of 100 m, 200 m and 400 m) in the Pacific Ocean	17-19	21-22
Movements of drifting buoys in the Pacific Ocean	20	22
Depth-longitude sections of temperature and anomalies along the equator in the Pacific Ocean	21	23
Monthly sea level anomalies in the Pacific Ocean (August 2000)	22	24
Monthly sea surface height anomalies in the global ocean (August 2000)	23	24
Long-term variations		
SST in the Global Ocean		
Long-term variations of monthly mean SST anomalies	24	25
Equatorial Pacific		
Time series of SST anomalies in the equatorial Pacific Ocean	25	26
El Niño monitoring indices	Table 1	27
Time-longitude sections of SST and its anomalies along the equator	26	28
Time-longitude sections of ocean heat content and its anomalies along the equator in the Pacific Ocean	27	29
Time-depth sections of equatorial Pacific subsurface temperature	28	30
Others		
Sea Ice	29	31
Oceanographic observations on-board research vessels of JMA	30	32
Geographical distribution of oceanographic data	31	33-34

海況の特徴（２０００年９月）

日本近海の海況

海面水温は、134°E以東の日本海東部及び北海道の東で平年より１℃以上高く、宗谷海峡付近及び国後島周辺には＋２℃を超える正偏差が見られた（第４図）。

黒潮は、上旬は九州から紀伊半島にかけて接岸、中・下旬は九州から足摺岬にかけて接岸した後、東北東に流れていた。その後、東海沖を南東に流れ、上・中旬は32°N、141°E付近で蛇行して八丈島付近をとおり、房総半島沖を北東に流れていた。下旬は31.5°N、140°E付近で北に向きを変え、房総半島沖を北東に流れていた（第９図）。

親潮系の冷水の沿岸寄りの分枝は40°N、143°Eまで、沖合の分枝は39°N、146°Eまで達していた（第５図）。

太平洋の海況

太平洋赤道域の海面水温は、165°E以西で＋0.5℃を超える正偏差となっていたほかは、ほぼ平年並だった。

北太平洋の海面水温は、オホーツク海及び35°Nから50°Nの日本の東からアラスカ湾の南の140°Wにかけて、平年より１℃以上高かった。またカリフォルニア半島南西沖にも＋0.5℃を超える正偏差が見られた（第16図）。

Highlights September 2000

Seas adjacent to Japan

SSTs were more than 1℃ above normal in the Japan Sea east of 134°E and east of Hokkaido. Positive SST anomalies exceeding +2℃ prevailed in the Soya Strait and around Kunashiri Island (Fig. 4).

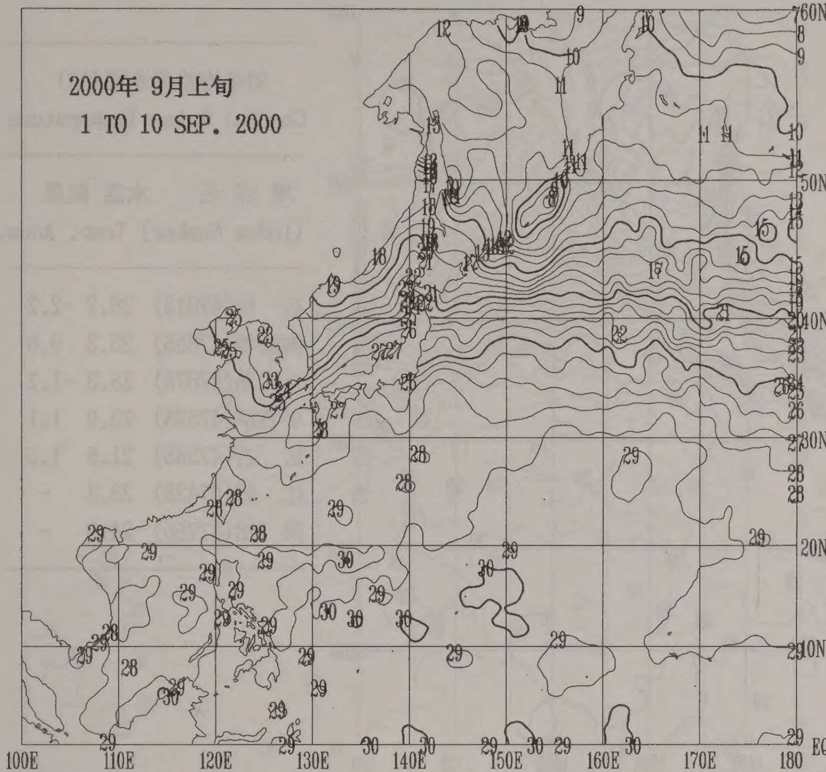
The Kuroshio flowed along the coasts from Kyushu to the Kii Peninsula in the first 10-day of the month, to Ashizuri-Misaki in the rest of the month, and flowed ENE-ward. Then the Kuroshio flowed southeastward off Tokai, meandered near 32°N, 141°E and passed near Hachijo Island in the first and second 10-days. In the last 10-day, the Kuroshio turned northward near 31.5°N, 140°E. After that, the Kuroshio flowed northeastward off the Boso Peninsula throughout the month (Fig. 9).

Coastal and off-coastal branches of the Oyashio cold water extended southward to 40°N, 143°E and 39°N, 146°E, respectively (Fig. 5).

Pacific Ocean

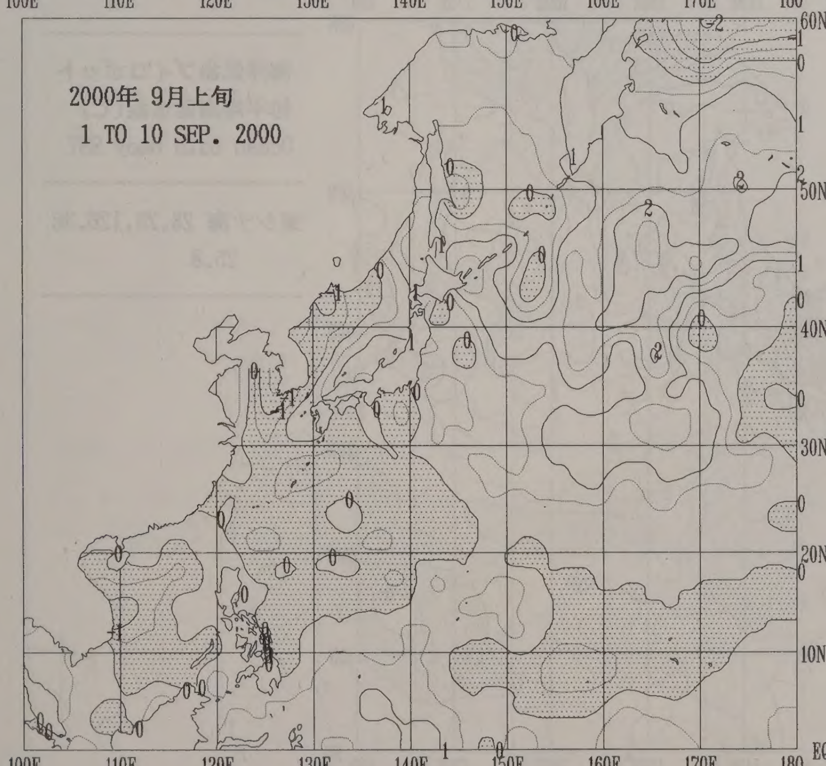
In the equatorial Pacific, SSTs were generally normal except west of 165°E where positive SST anomalies exceeding +0.5℃ were found.

In the North Pacific, positive SST anomalies exceeding +1℃ prevailed in the Sea of Okhotsk and from the seas east of Japan to 140°W, south of the Gulf of Alaska. SSTs were more than 0.5℃ above normal southwest of the California Peninsula (Fig. 16).



旬平均沿岸水温(℃)
Coastal Water Temperature

地 点 名 (Index Number)	水温 Temp.	偏差 Anom.
石 垣(47918)	27.9	-0.9
御前崎(47655)	24.7	-1.1
八丈島(47678)	25.9	-1.0
小名浜(47598)	22.4	0.1
宮 古(47585)	21.9	1.9
江 差(47428)	24.8	-
浜 田(47755)	27.8	-



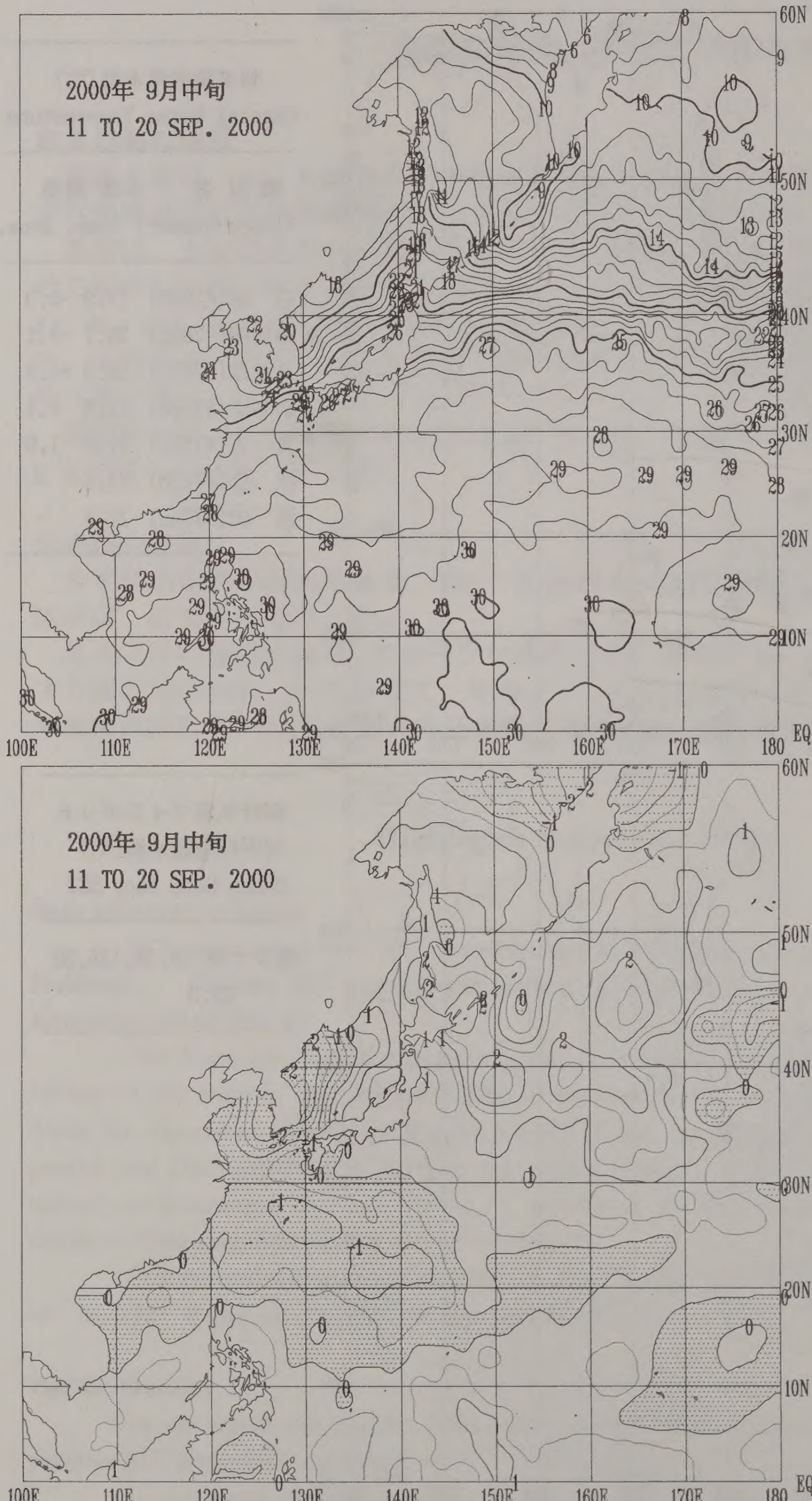
海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

東シナ海 28.2N,126.3E
28.3

第1図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(2000年 9月上旬)

Fig.1 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 1st ten-day period in SEP 2000. Anomalies are computed from the JMA climatology (1961-90). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

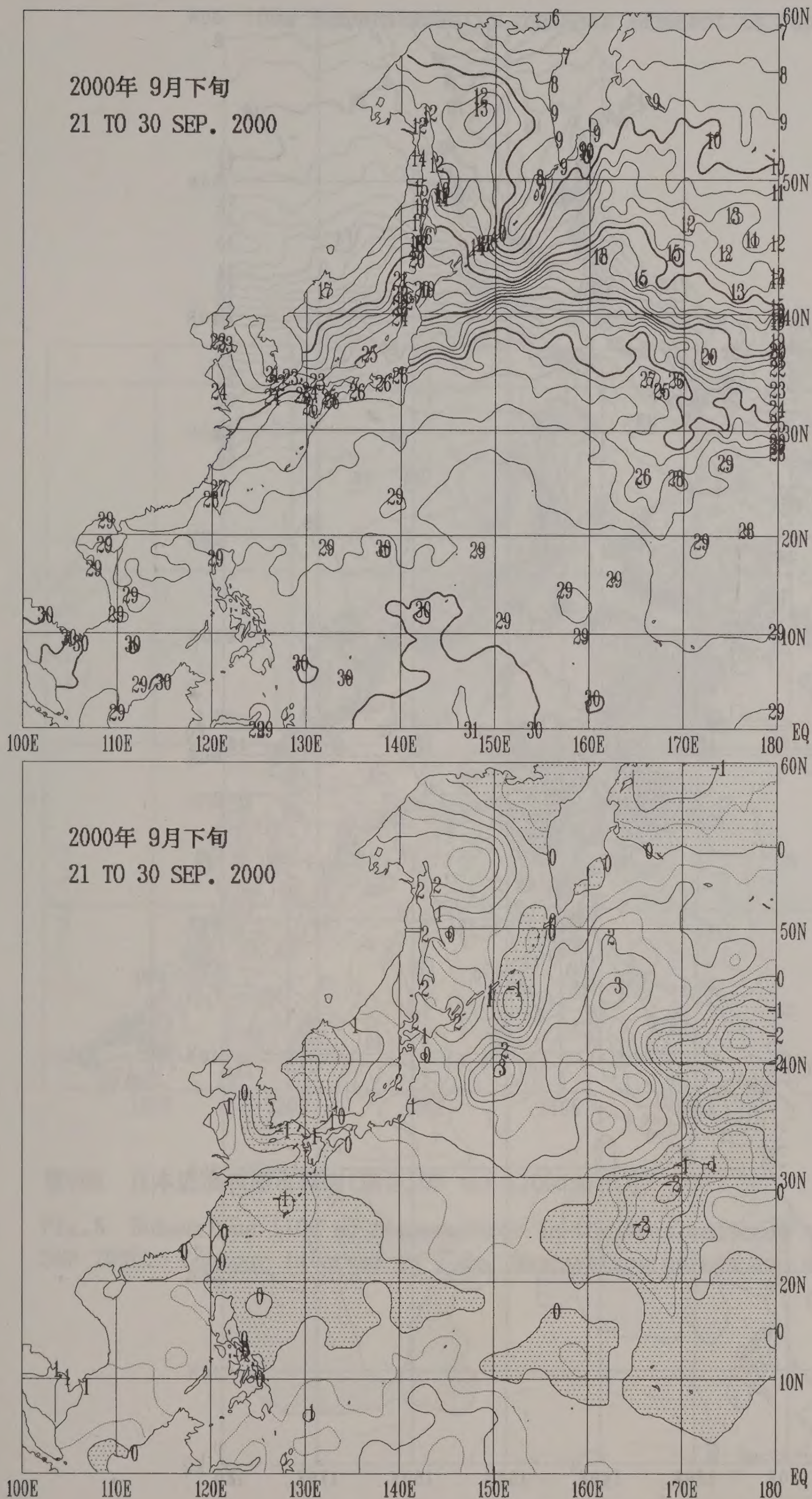
地点名 (Index Number)	水温 Temp.	偏差 Anom.
石 垣(47918)	26.2	-2.2
御前崎(47655)	25.3	0.6
八丈島(47678)	25.3	-1.2
小名浜(47598)	23.0	1.1
宮 古(47585)	21.5	1.5
江 差(47428)	23.3	-
浜 田(47755)	24.9	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

東シナ海 28.2N,126.3E	25.8

第2図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(2000年 9月中旬)

Fig.2 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 2nd ten-day period in SEP 2000. Anomalies are computed from the JMA climatology (1961-90). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.

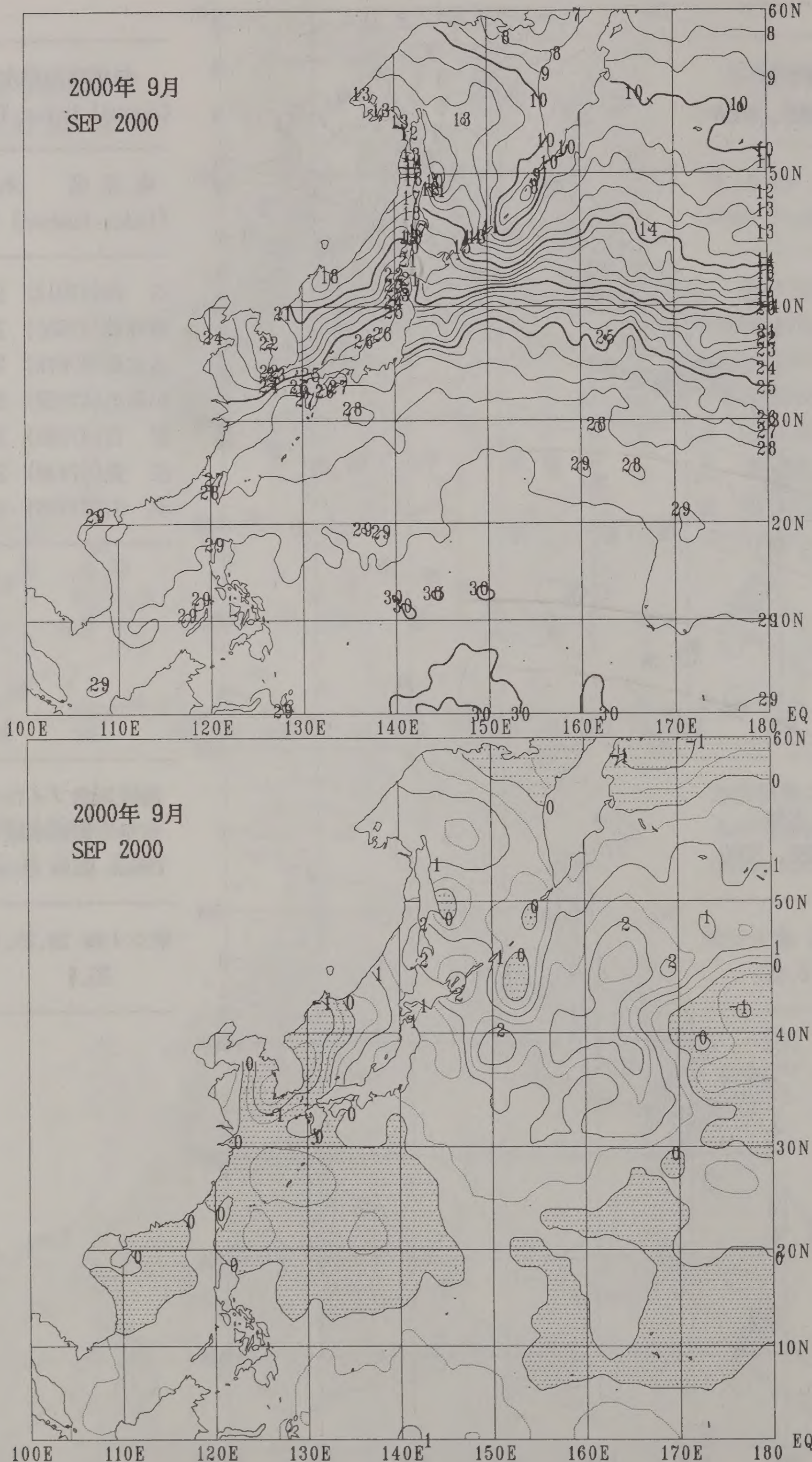


旬平均沿岸水温(℃) Coastal Water Temperature		
地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	27.0	-0.9
御前崎(47655)	24.8	1.3
八丈島(47678)	24.6	-1.3
小名浜(47598)	22.7	1.2
宮　古(47585)	20.8	1.2
江　差(47428)	22.0	-
浜　田(47755)	23.8	-

海洋気象ブイロボット 旬平均海面水温(℃) Ocean Data Buoy SST
東シナ海 28.2N,126.3E 26.4

第3図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(2000年 9月下旬)

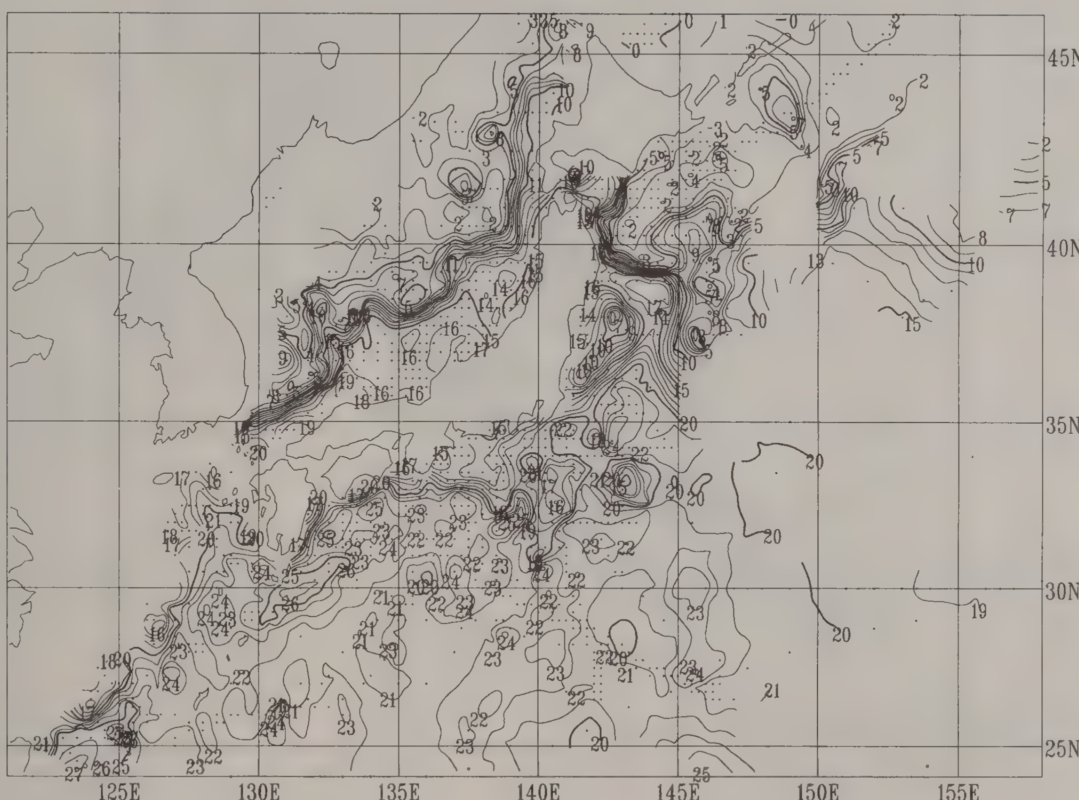
Fig.3 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 3rd ten-day period in SEP 2000. Anomalies are computed from the JMA climatology (1961-90). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.



第4図 北西太平洋月平均海面水温図(上)及び偏差図(下)(2000年 9月)

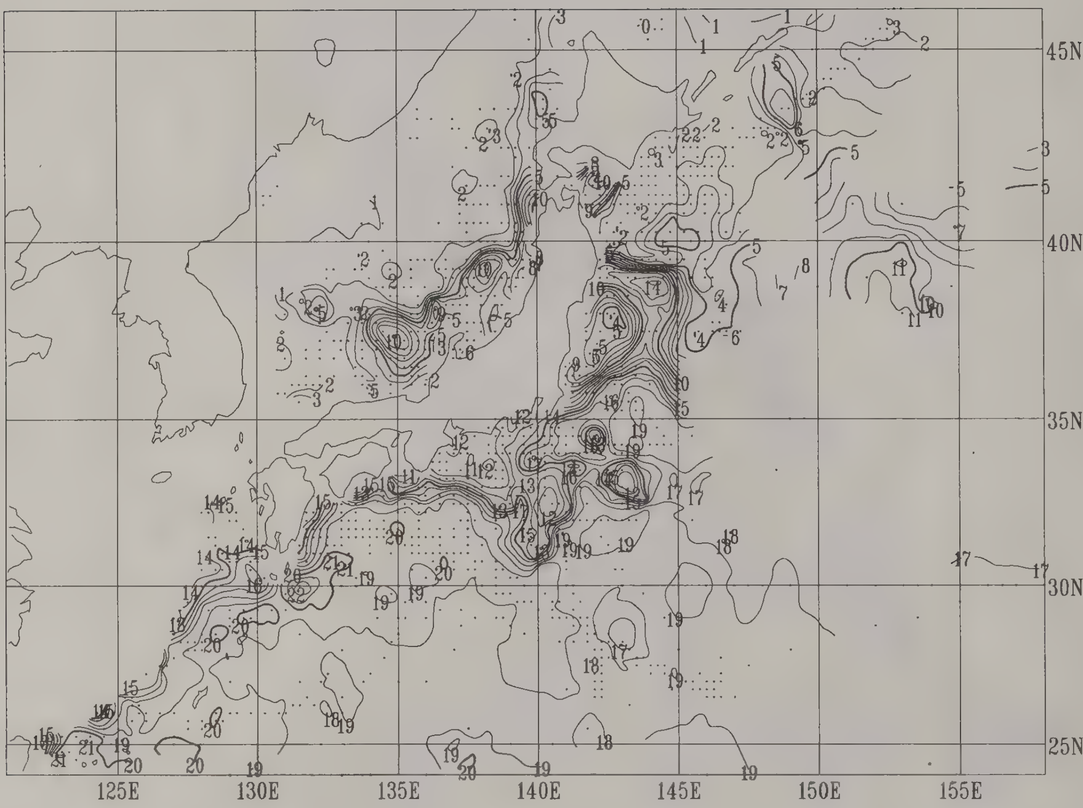
Fig.4 Monthly mean SST (top) and anomalies (bottom) in the western North Pacific for SEP 2000. Anomalies are computed from the JMA climatology (1961-1990). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.

100m Temperatures in the Seas Adjacent to Japan



第5図　日本近海表層水温図(深さ100 m) (2000年 9月)

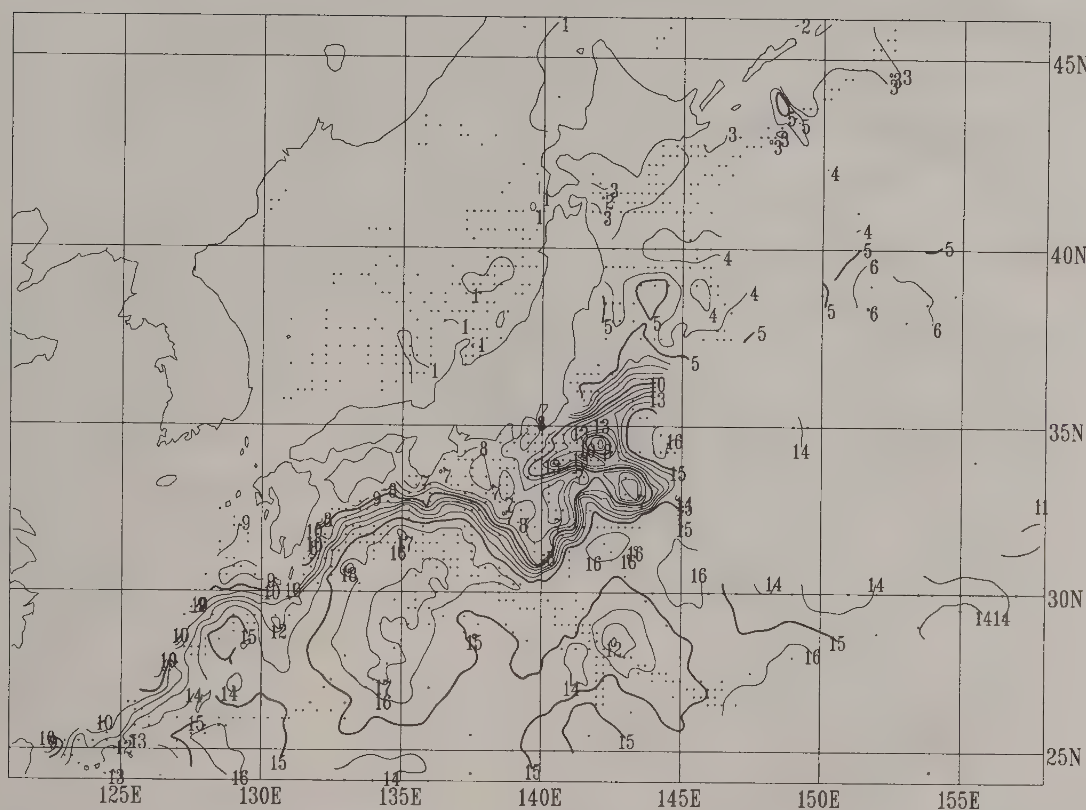
Fig.5 Subsurface (100 m) temperatures in the seas adjacent to Japan for SEP 2000. Contour interval is 1°C. Observation points are denoted by dots.



第6図　日本近海表層水温図(深さ200 m)（2000年 9月）

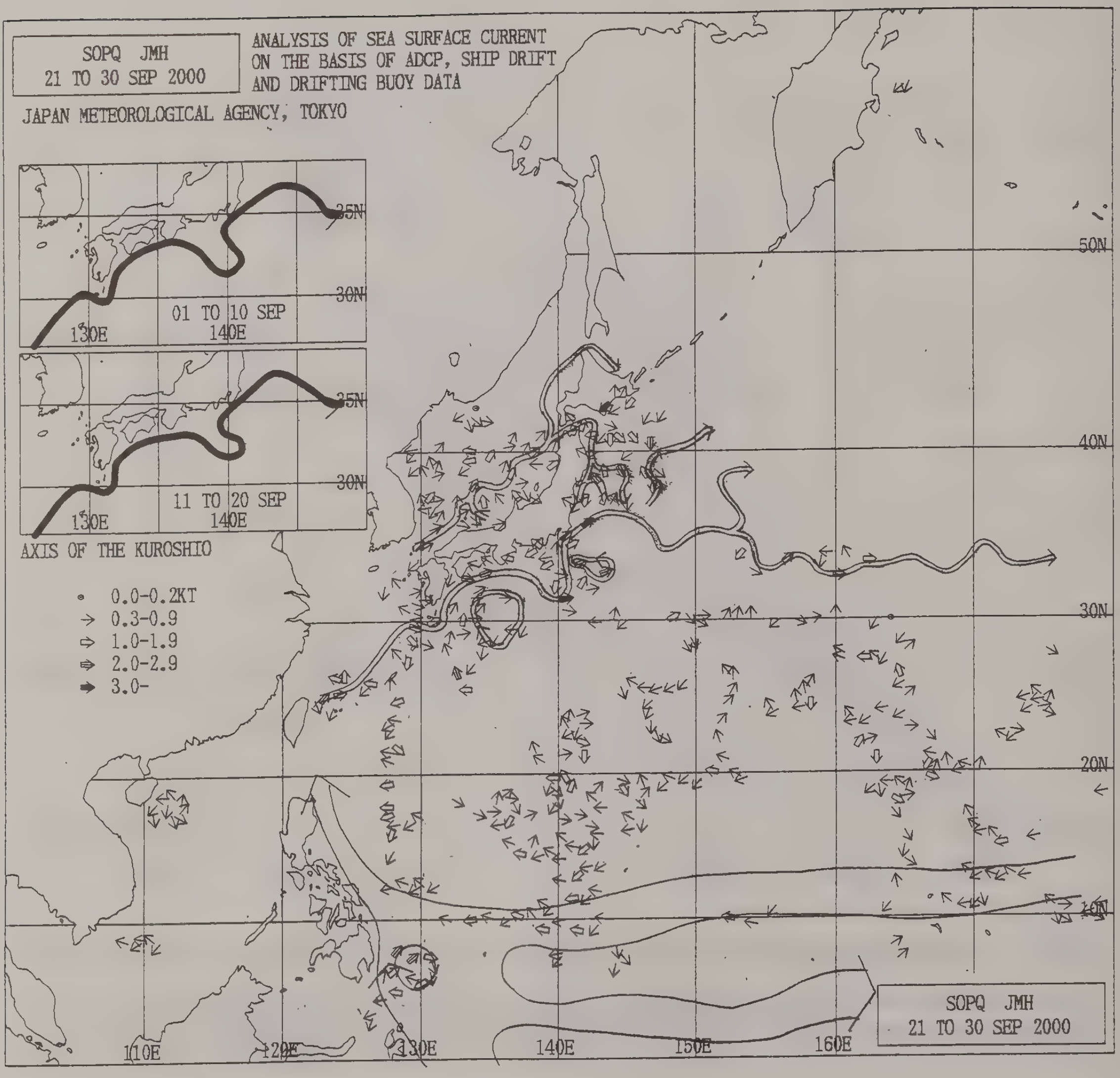
Fig.6　Subsurface (200 m) temperatures in the seas adjacent to Japan for SEP 2000.　Contour interval is 1°C.　Observation points are denoted by dots.

400m Temperatures in the Seas Adjacent to Japan



第7図　日本近海表層水温図(深さ400 m) (2000年 9月)

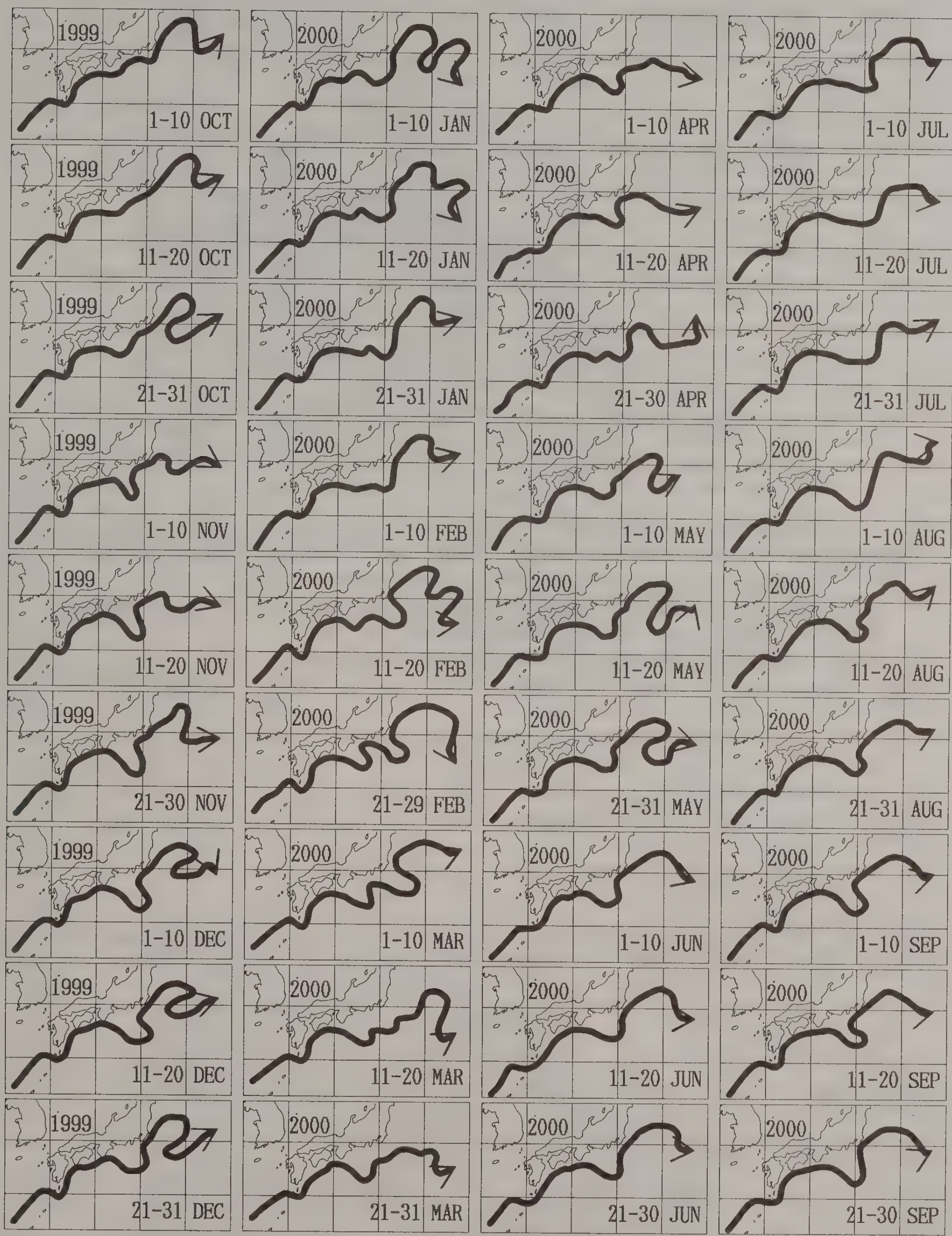
Fig.7 Subsurface (400 m) temperatures in the seas adjacent to Japan for SEP 2000. Contour interval is 1°C. Observation points are denoted by dots.



第 8 図　北西太平洋海流図（2000 年 9 月下旬）

Fig. 8　Analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in September 2000. Small arrows indicate *in situ* observations. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

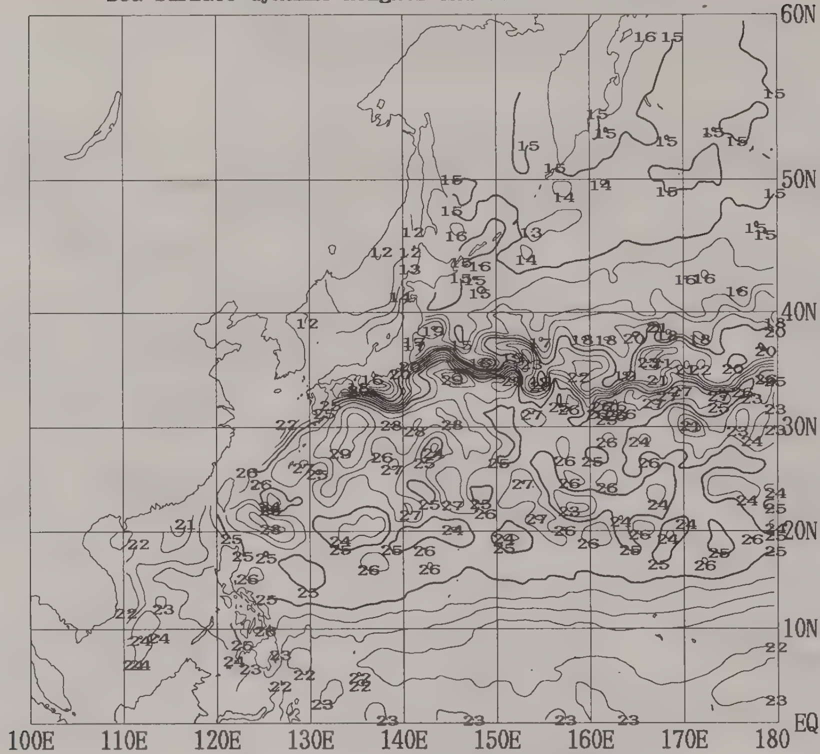
Location of the Kuroshio axis



第9図 旬別黒潮流軸図

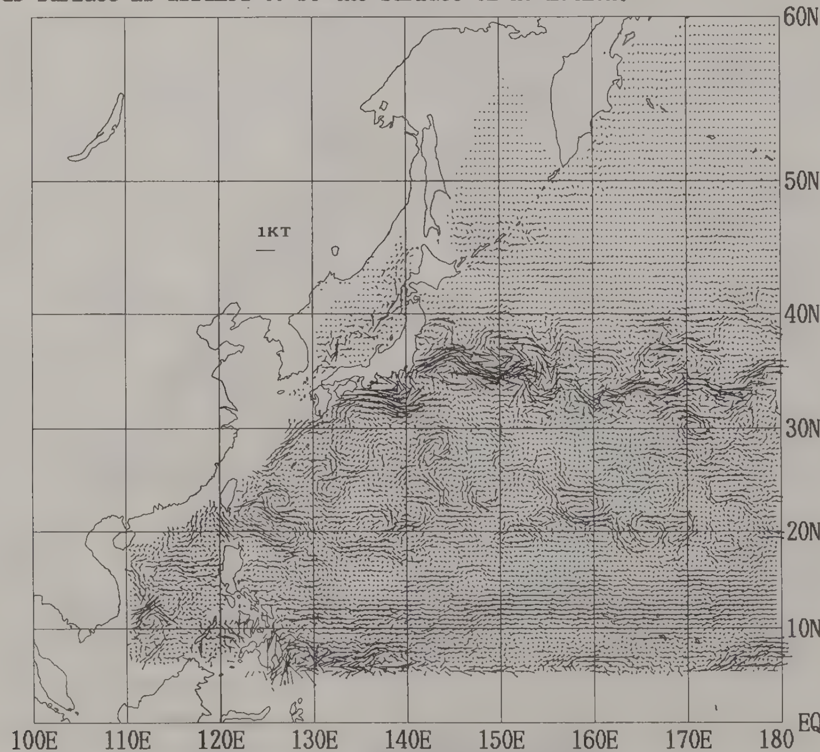
Fig.9 Location of the Kuroshio axis

Sea surface dynamic heights and current distribution



第10図 北西太平洋力学的海面高度分布図(2000年 9月22日)

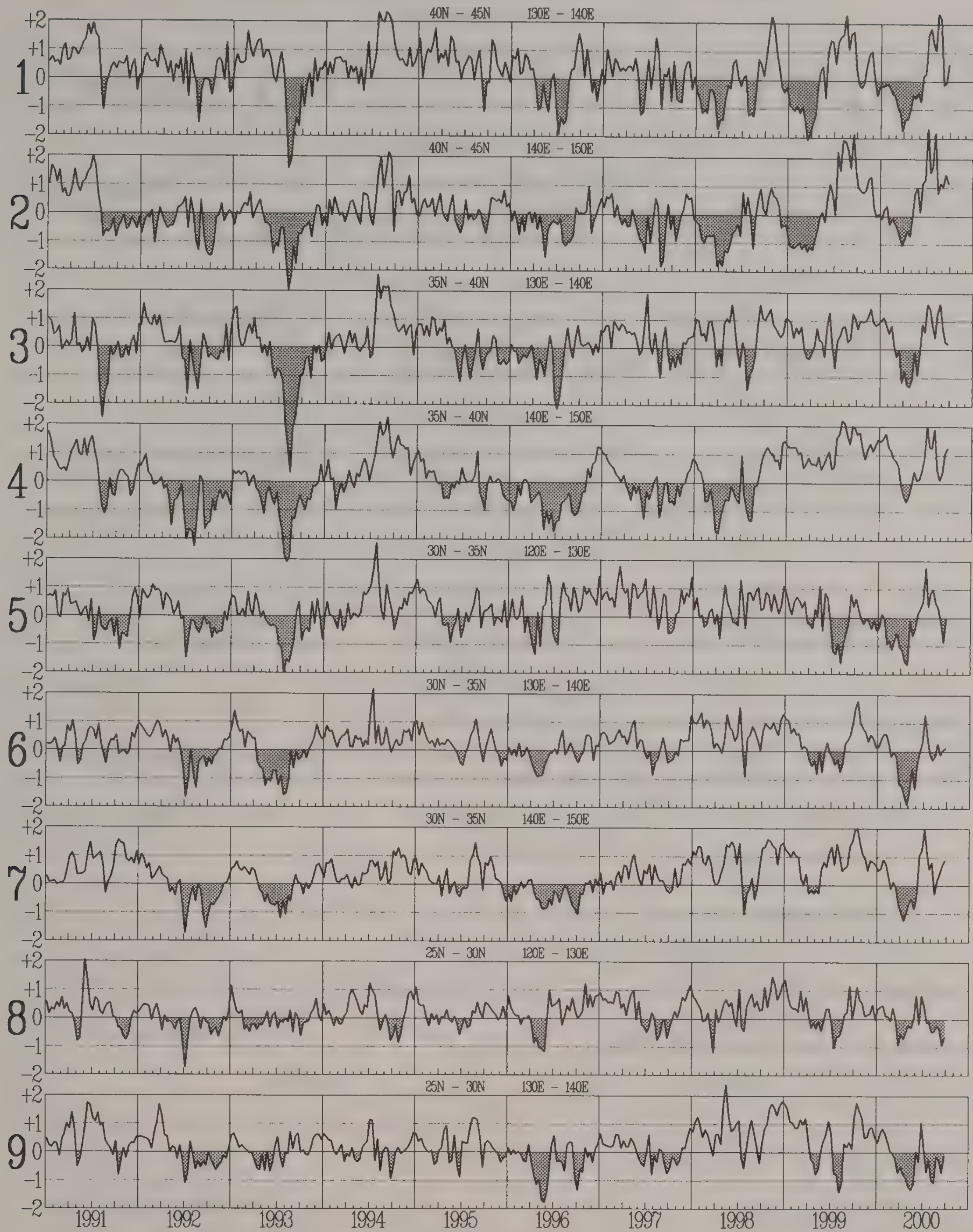
Fig.10 Sea surface dynamic heights (10 cm) in the western North Pacific derived from the altimeter data of TOPEX/POSEIDON (SEP 22, 2000).
1500 db surface is assumed to be the surface of no motion.

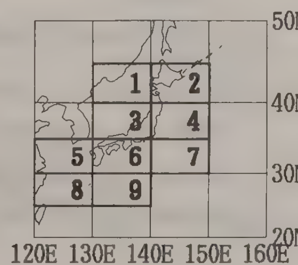


第11図 北西太平洋海流ベクトル図(2000年 9月22日)

Fig.11 Sea surface current vectors in the western North Pacific (SEP 22, 2000). Vectors are derived from the sea surface dynamic heights from TOPEX/POSEIDON and subsurface temperature distribution assuming the geostrophic relation.

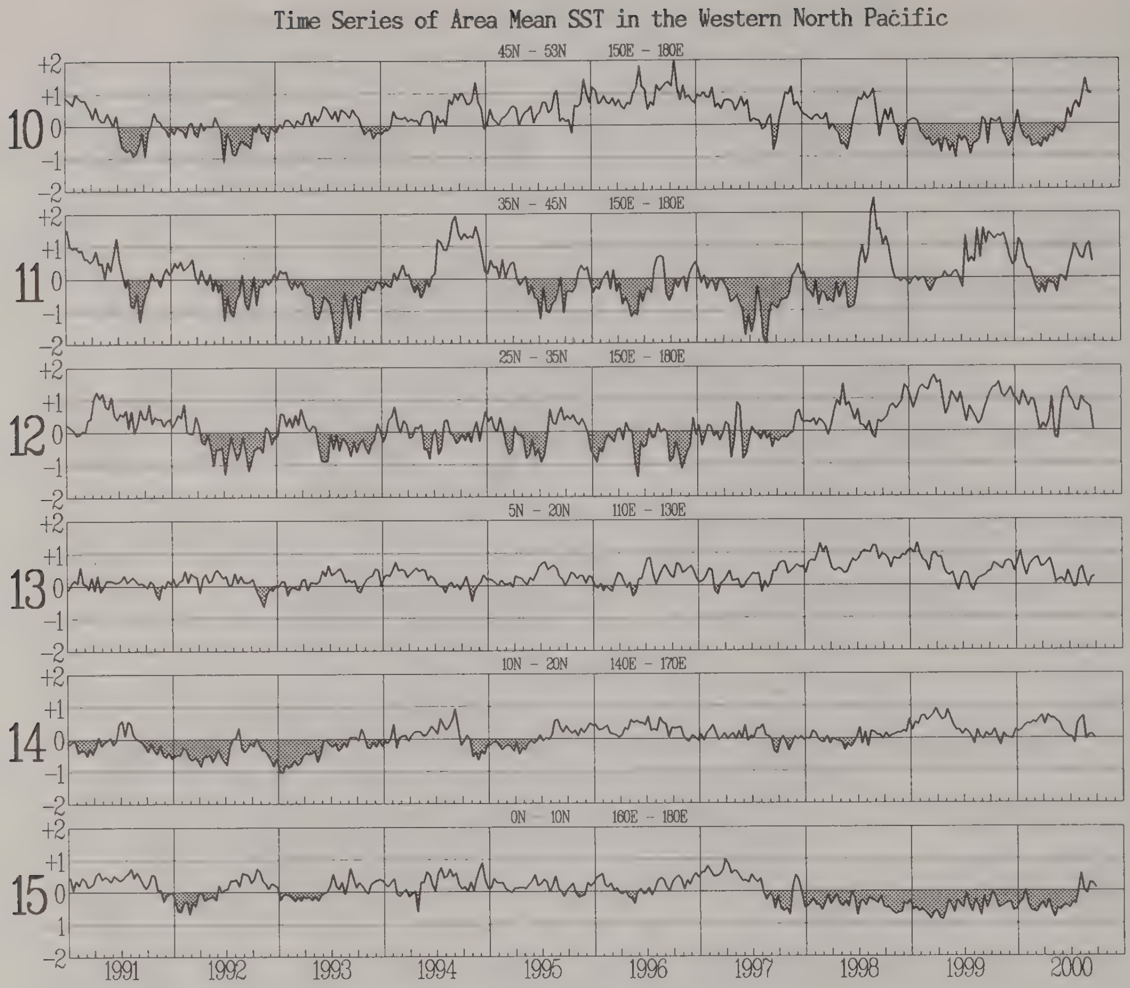
Time Series of Area Mean SST in the Western North Pacific





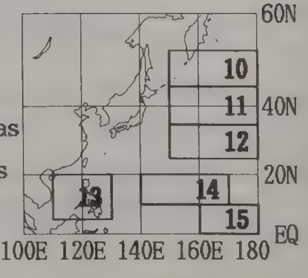
第12図　海域別旬平均海面水温平年偏差時系列図

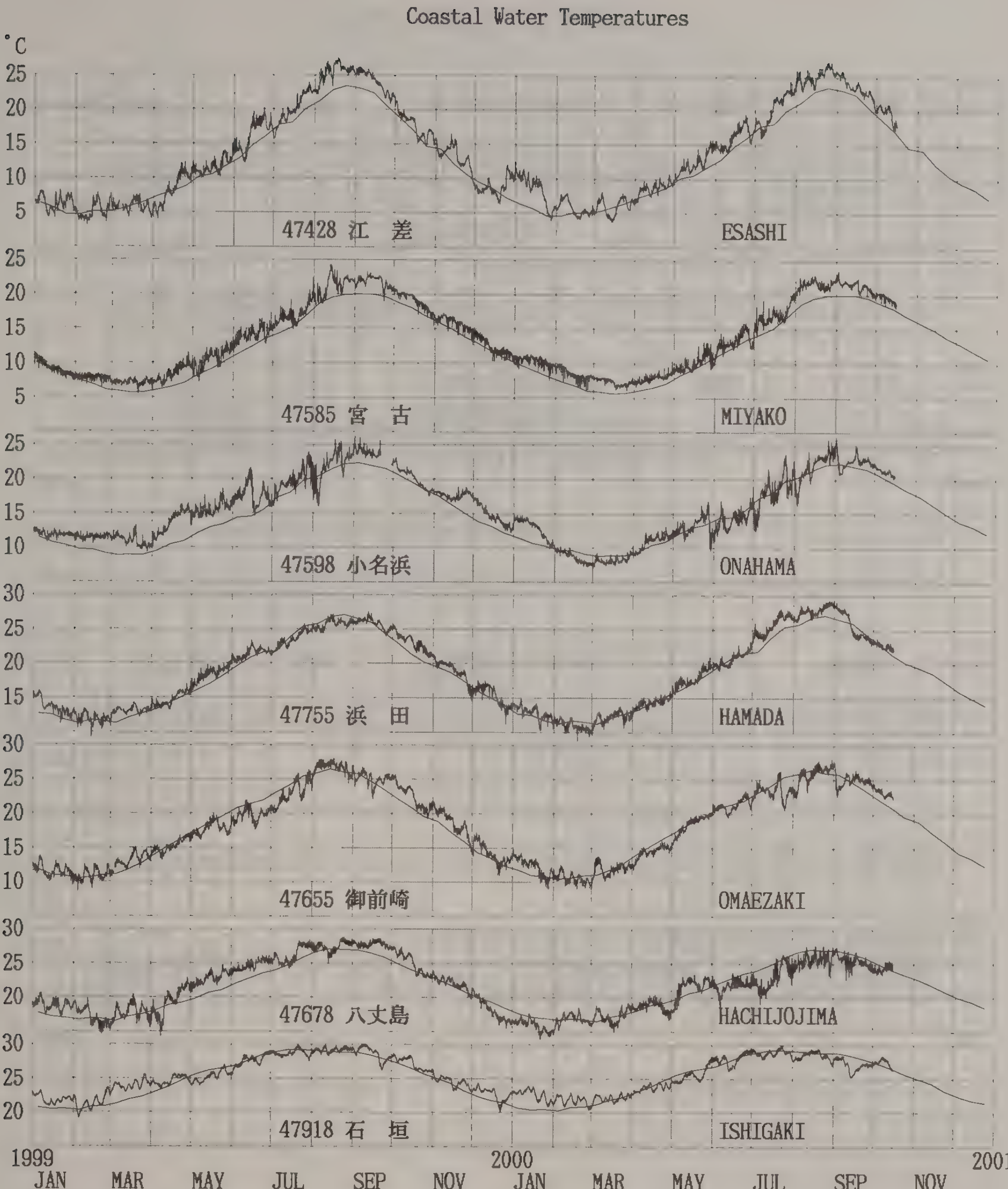
Fig.12 Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas shown in the right panel. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1961-90).

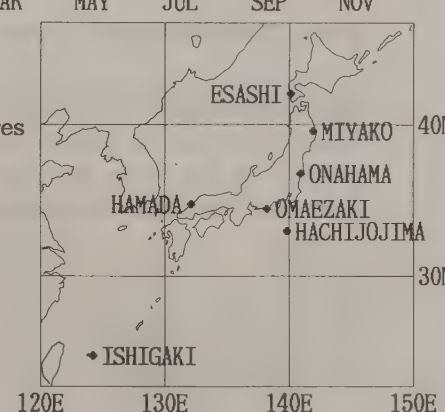


第12図　海域別旬平均海面水温平年偏差時系列図（つづき）

Fig.12 (continue) Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas shown in the right panel. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1961-90).



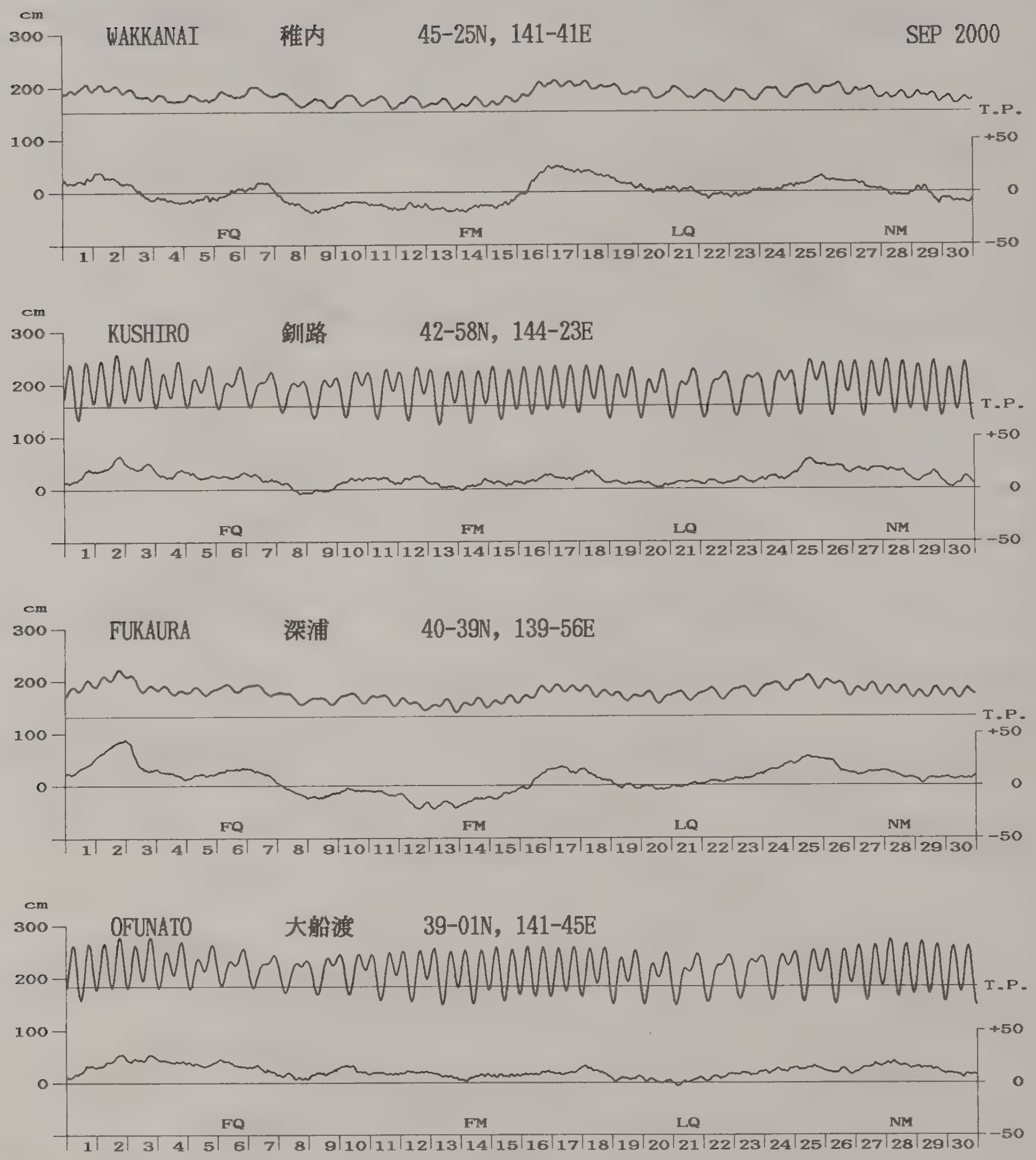




第13図 沿岸水温時系列図

Fig.13 Time series of hourly coastal water temperatures (°C) measured at 7 coastal stations of the JMA shown in the right panel.

Thin lines show ten-day mean climatology.

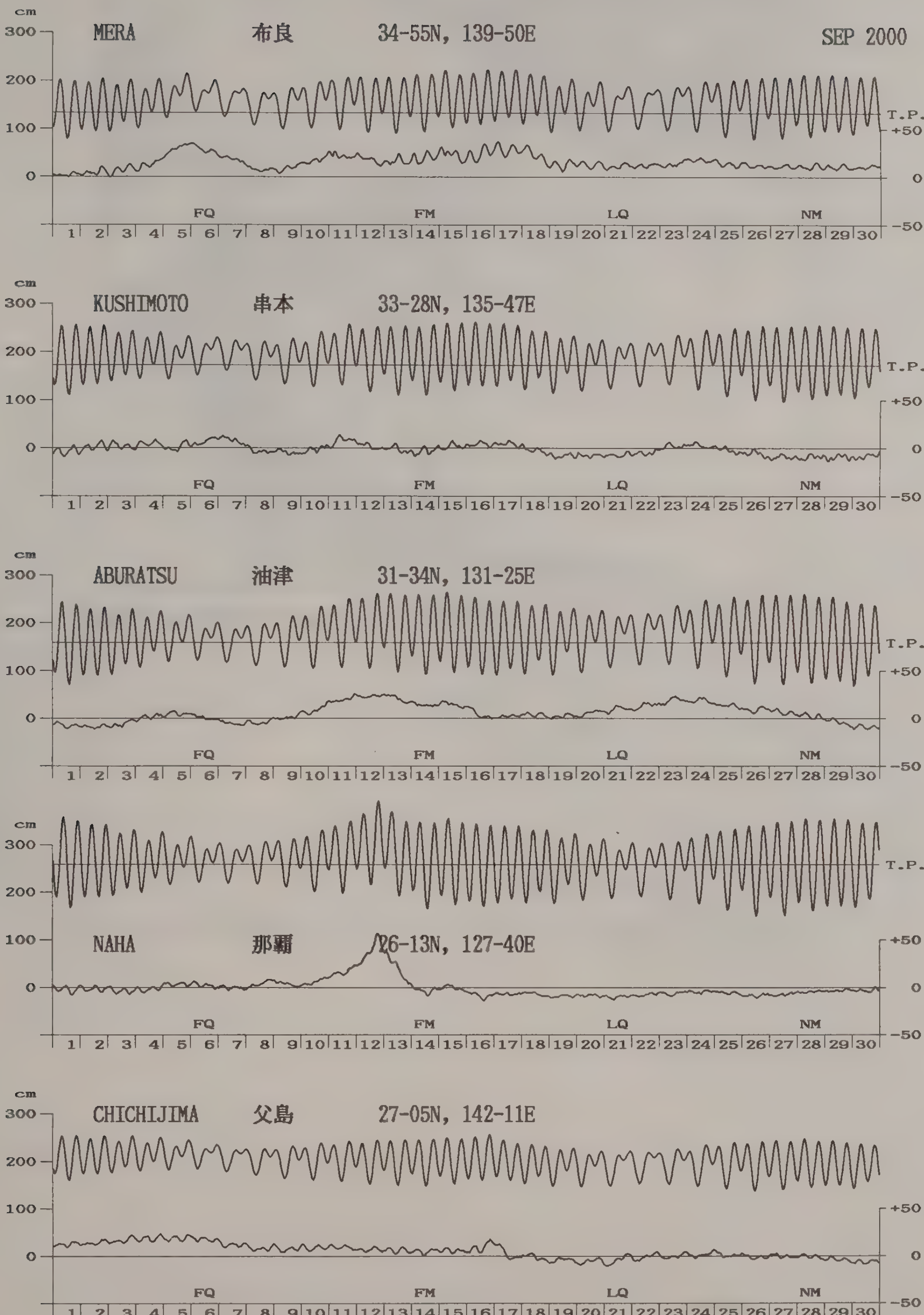


第14図 沿岸潮位時系列図（2000年 9月）

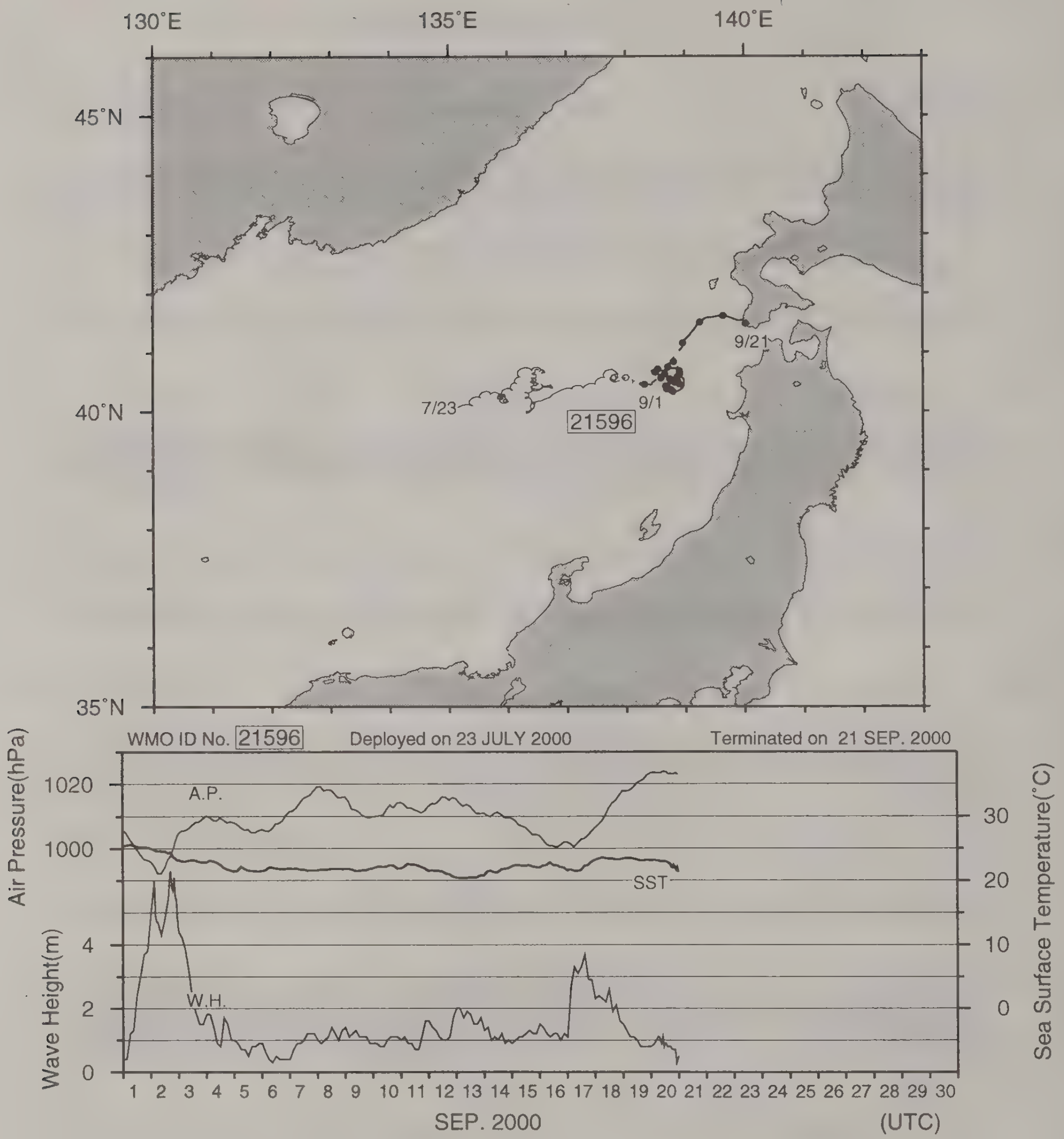
Fig.14 Time series of hourly sea level observation (upper line) and its anomalies (lower line) at 9 stations of the JMA in the right panel.
Short term variations are removed from raw data.

NM: new moon, FQ: first quarter
FM: full moon, LQ: last quarter
T.P.: Mean sea level of Tokyo Bay (Tokyo Peil)



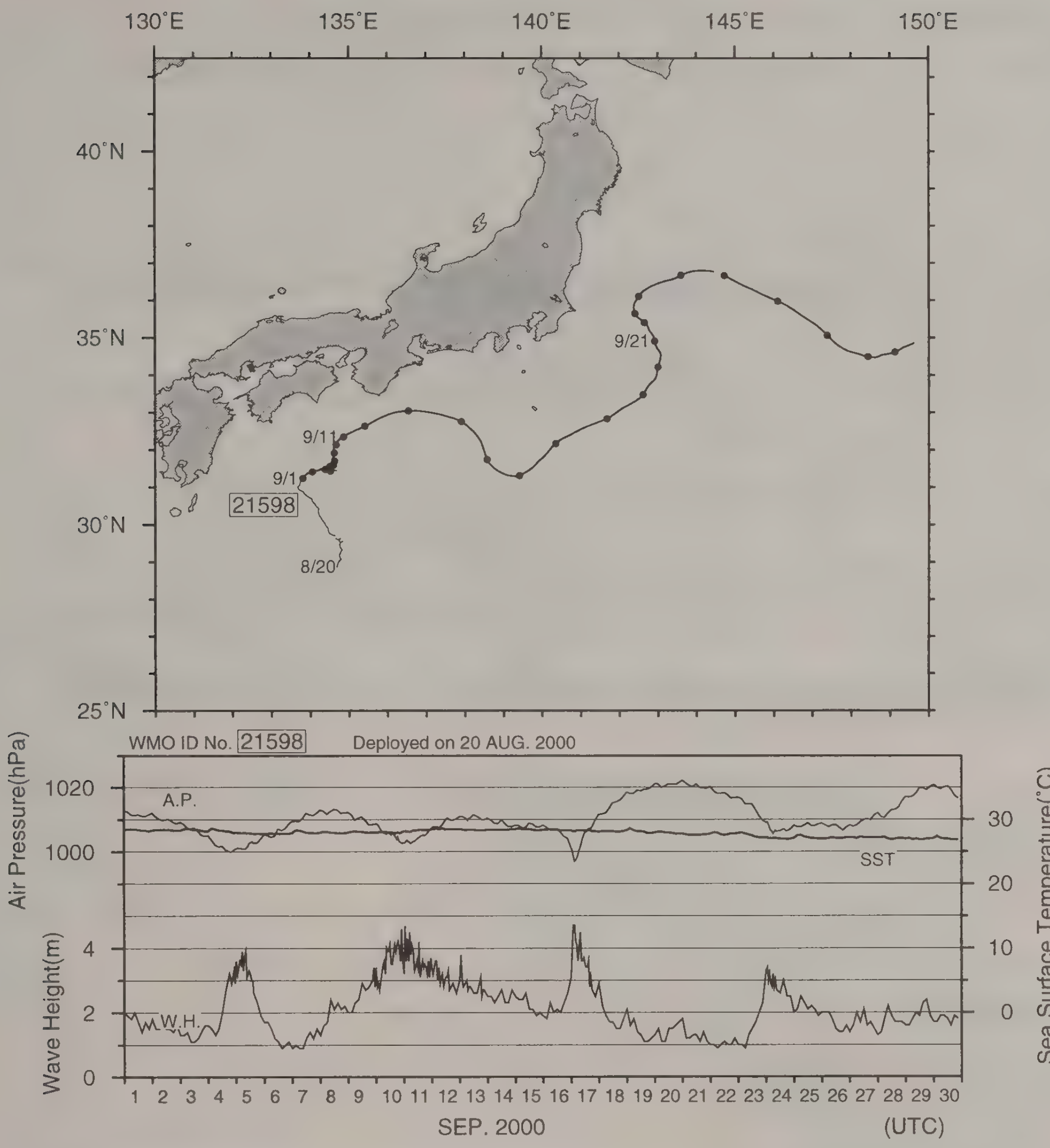


第14図 つづき
Fig.14 continue



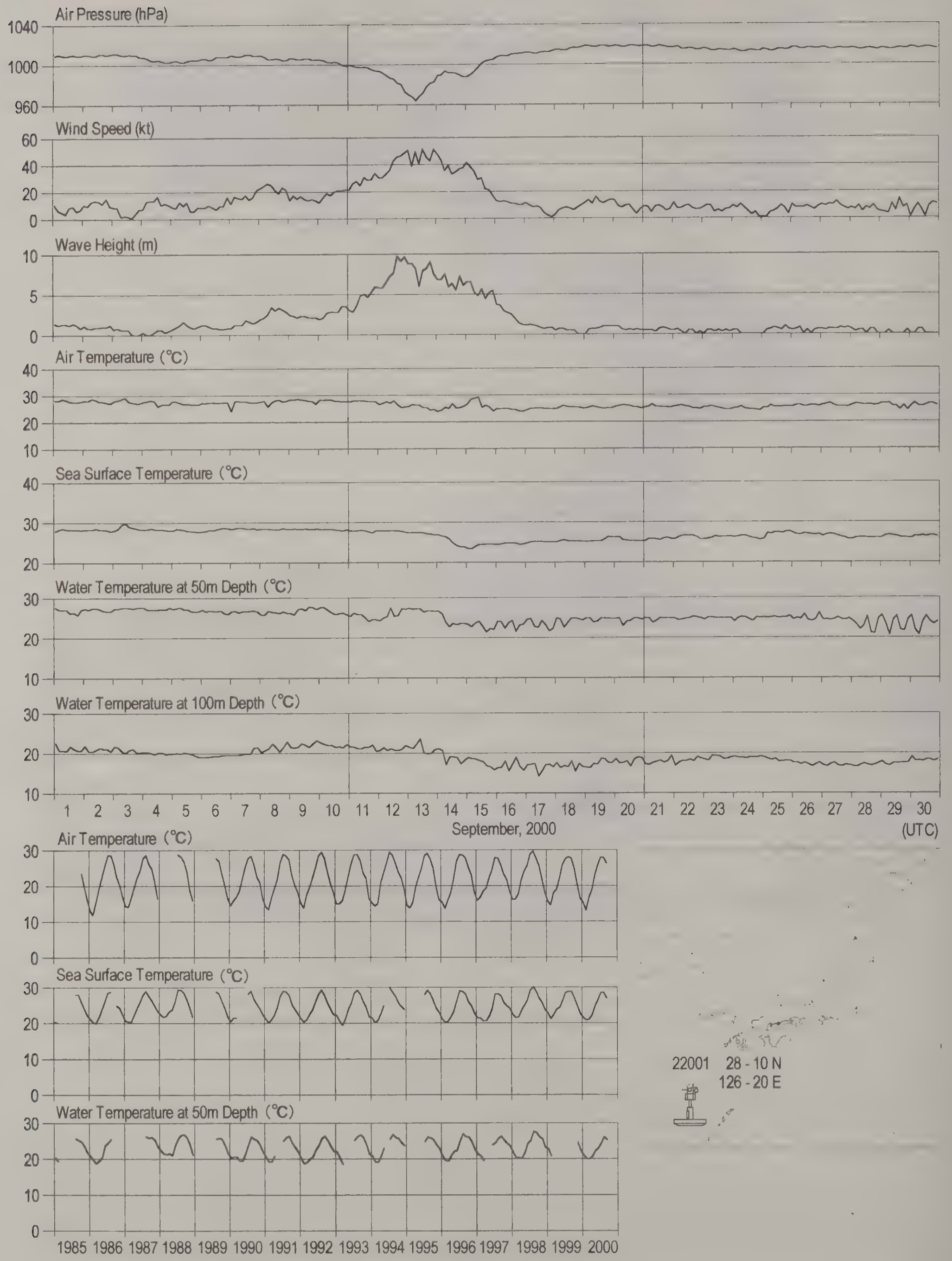
第15-1図　漂流型海洋気象ブイロボットの軌跡と観測要素の時系列図（日本海）

Fig.15-1　Time series of JMA drifting buoy observation in the Japan Sea.
The upper panel shows path(s) of the buoy(s). Solid circles denote the position at 00h UTC everyday.
The lower panel shows time series of observation data.



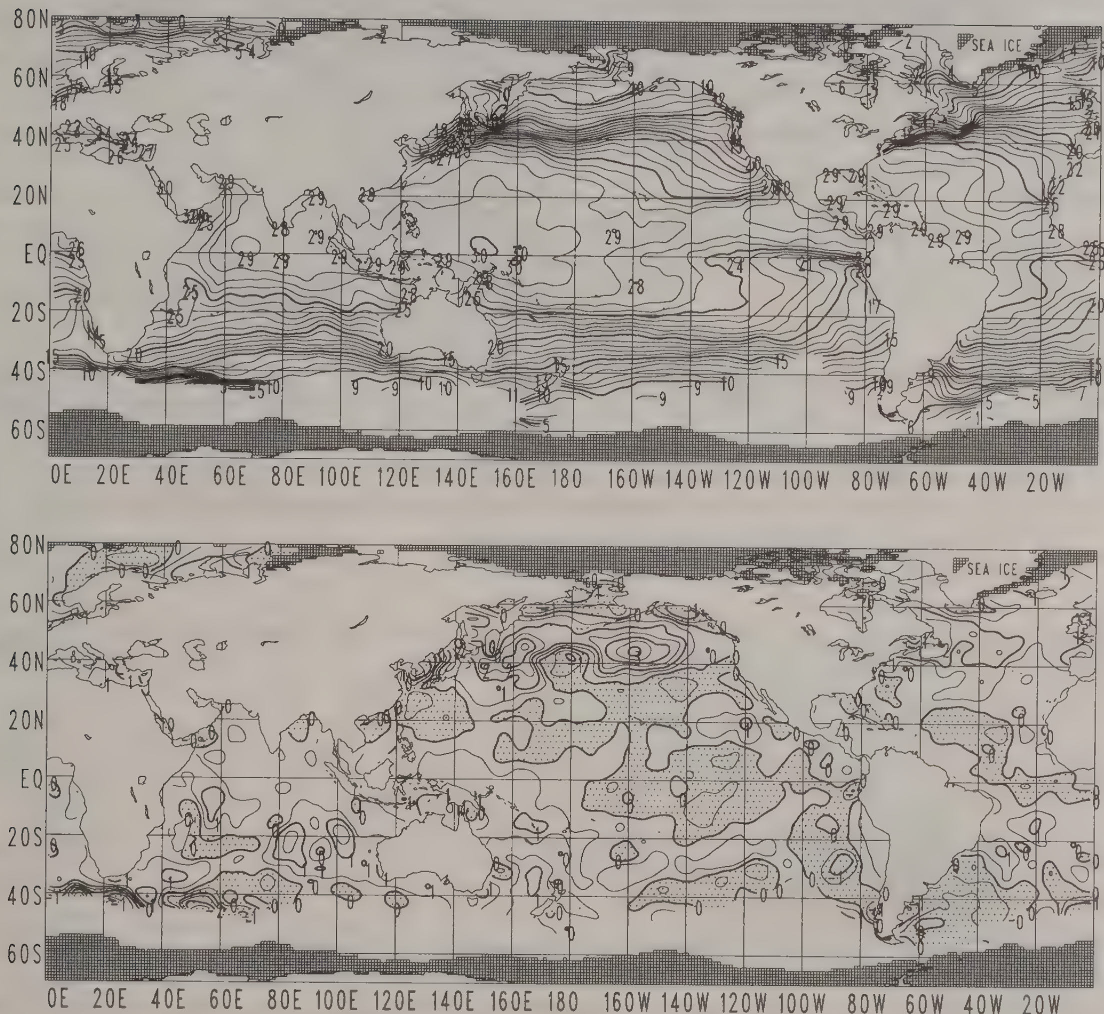
第15-2図　漂流型海洋気象ブイロボットの軌跡と観測要素の時系列図（四国沖）

Fig.15-2　Time series of JMA drifting buoy observation south of Shikoku.
The upper panel shows path(s) of the buoy(s). Solid circles denote the position at 00h UTC everyday.
The lower panel shows time series of observation data.



第15-3図 海洋気象ブイロボットによる観測要素の時系列図（東シナ海：22001）
上段は３時間毎の観測値を、下段は月平均値を示す。

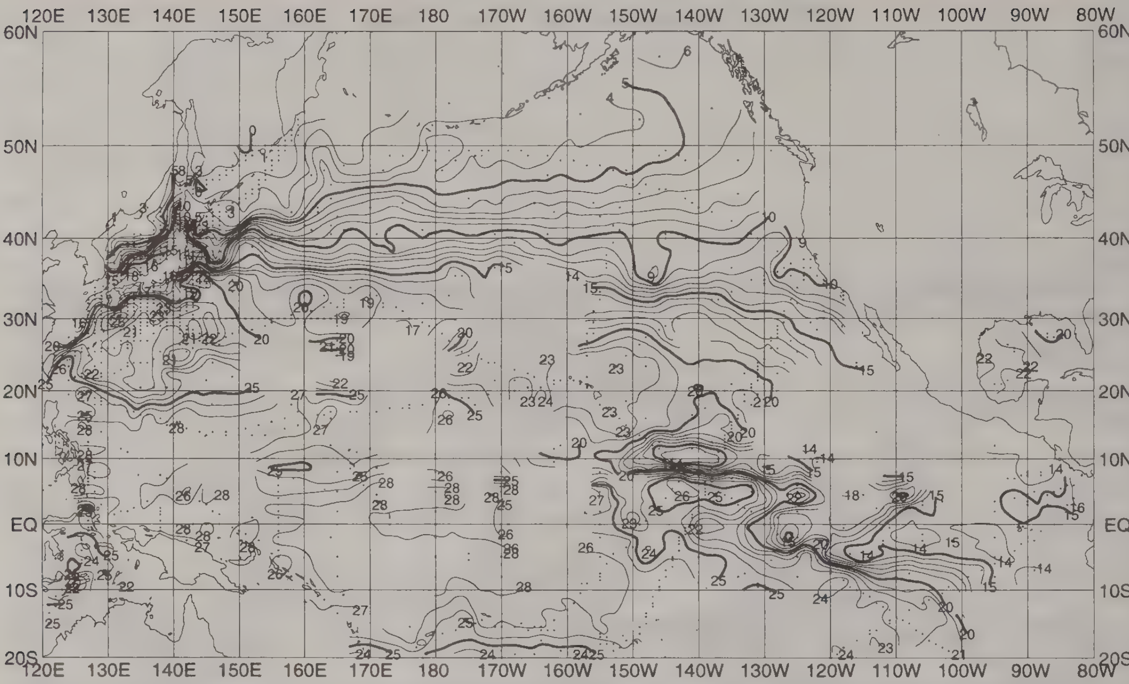
Fig.15-3 Time series of JMA buoy observation in the East China Sea (WMO ID No. 22001).
The upper panel shows three hourly observation and the lower panel shows the monthly mean data.



第16図　全球月平均海面水温図（上）及び偏差図（下）（2000年 9月）

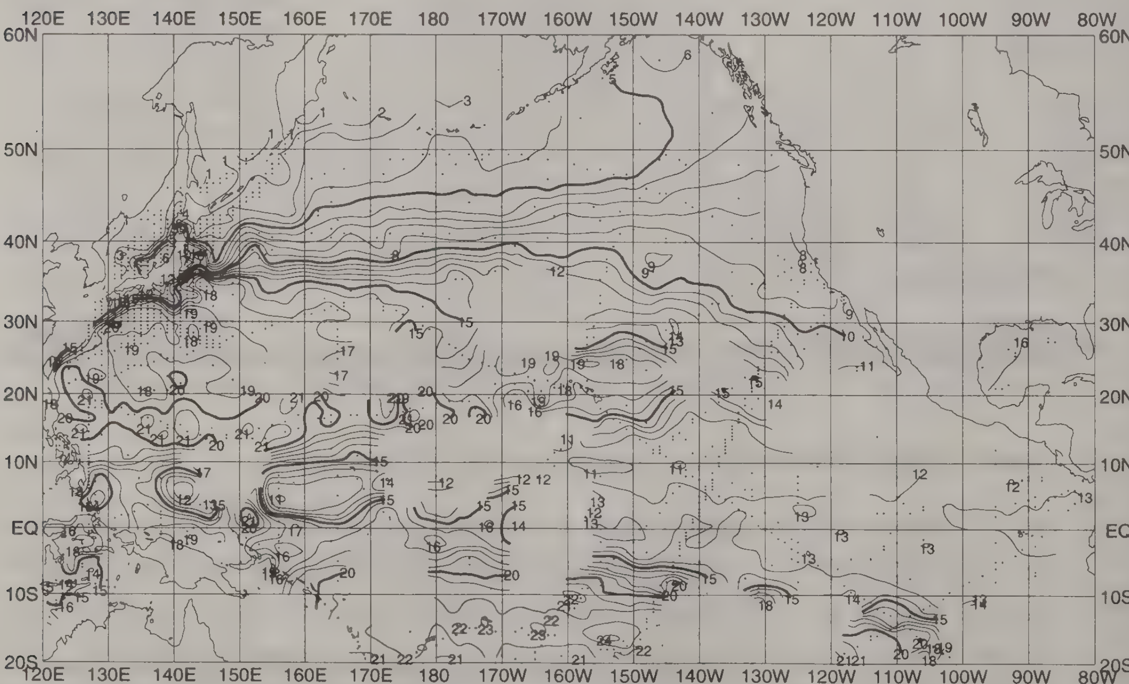
Fig.16 Monthly mean sea surface temperature over the global ocean (top) and anomalies (bottom) for SEP 2000. Anomalies are computed from the JMA climatology (1961-1990). Contour interval is 1°C (top) and additional anomaly contours of ±0.5°C are shown by thin lines. Negative anomalies are spotted. Maximum coverage of sea ice is shaded. Data sources for sea ice are U.S. National Ice Center (polar regions) and JMA (the Sea of Okhotsk).

100m/200m Temperatures in the Pacific Ocean



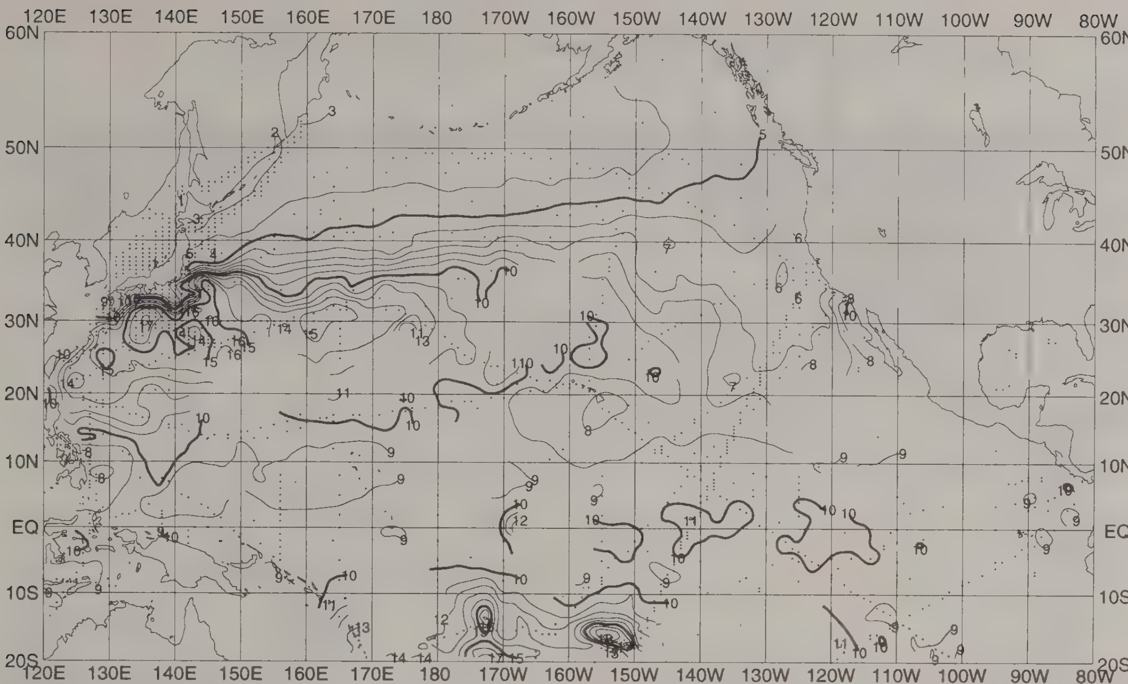
第 17 図　太平洋表層水温図（深さ 100 m）　(2000 年 9 月)

Fig. 17　Subsurface (100 m) temperatures in the Pacific Ocean for September 2000. Contour interval is 1 ℃. Observation points are denoted by dots.



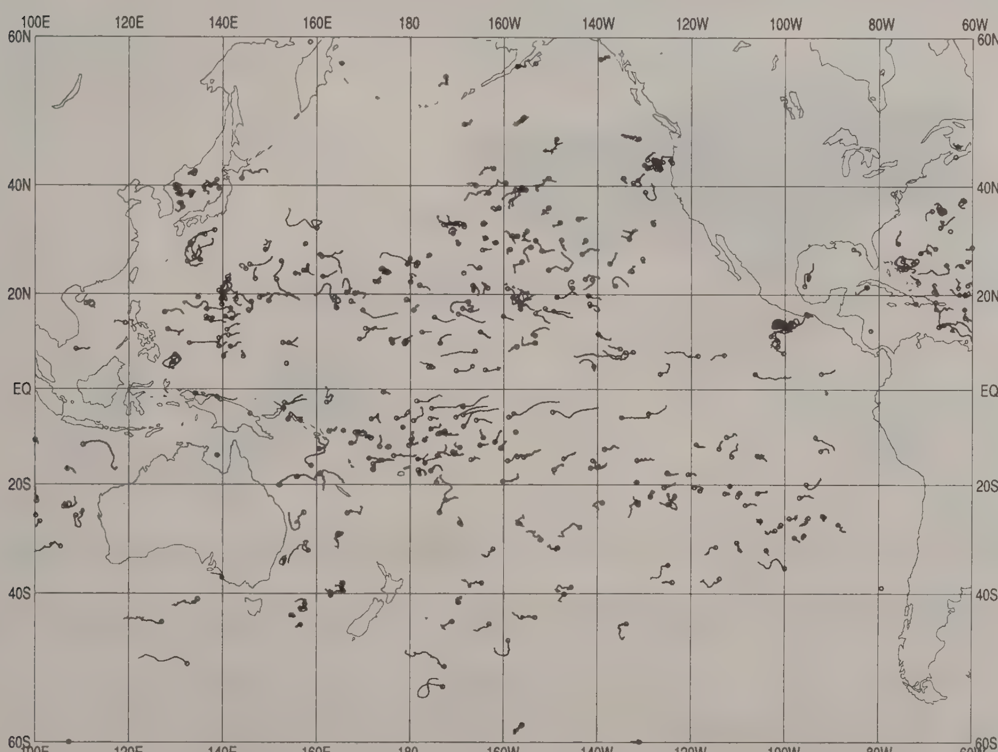
第 18 図　太平洋表層水温図（深さ 200 m）　(2000 年 9 月)

Fig. 18　Subsurface (200 m) temperatures in the Pacific Ocean for September 2000. Contour interval is 1 ℃. Observation points are denoted by dots.



第 19 図　太平洋表層水温図（深さ 400 m）（2000 年 9 月）

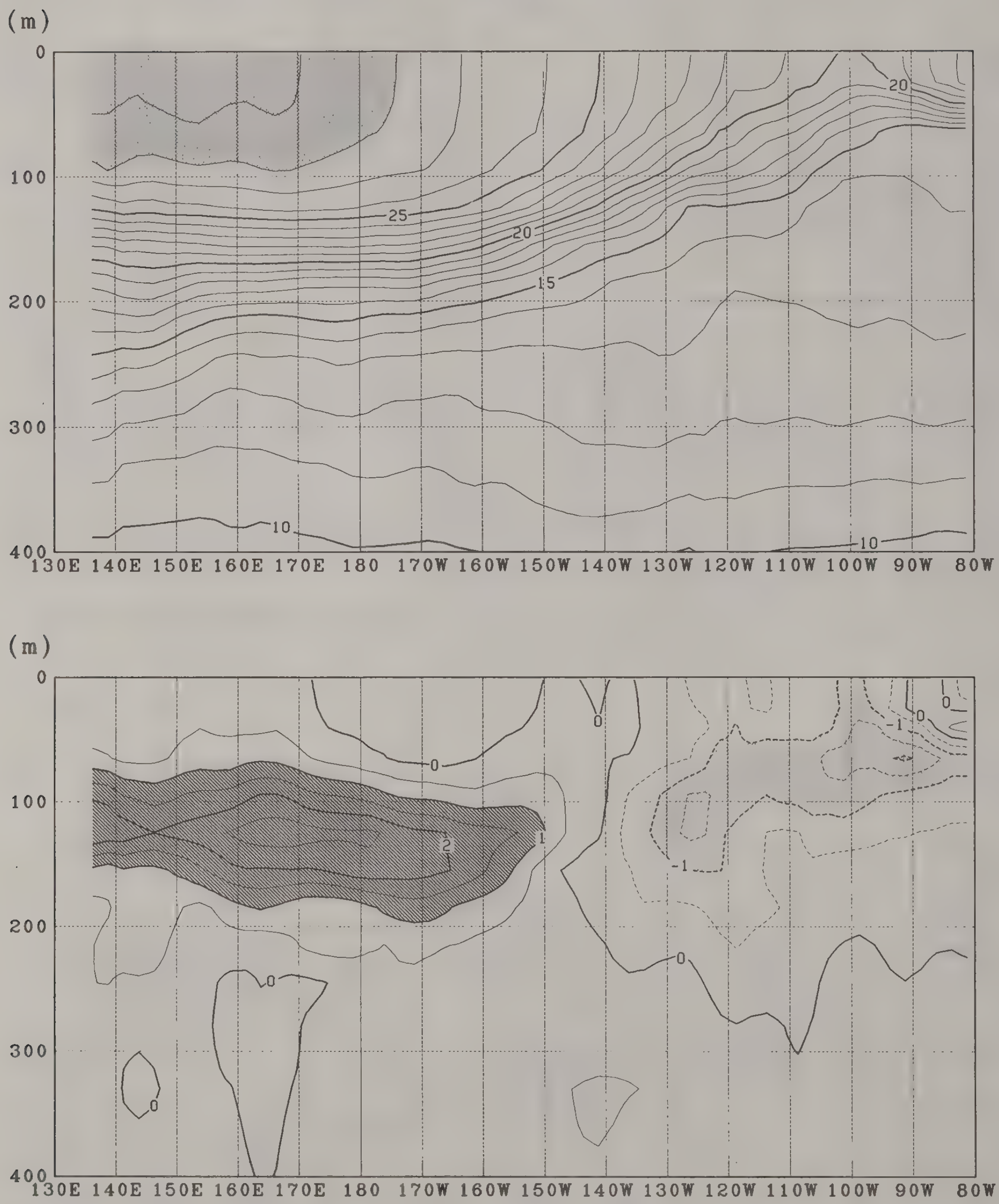
Fig. 19　Subsurface (400 m) temperatures in the Pacific Ocean for September 2000. Contour interval is 1 ℃. Observation points are denoted by dots.



第 20 図　太平洋ブイ流跡図（2000 年 9 月）

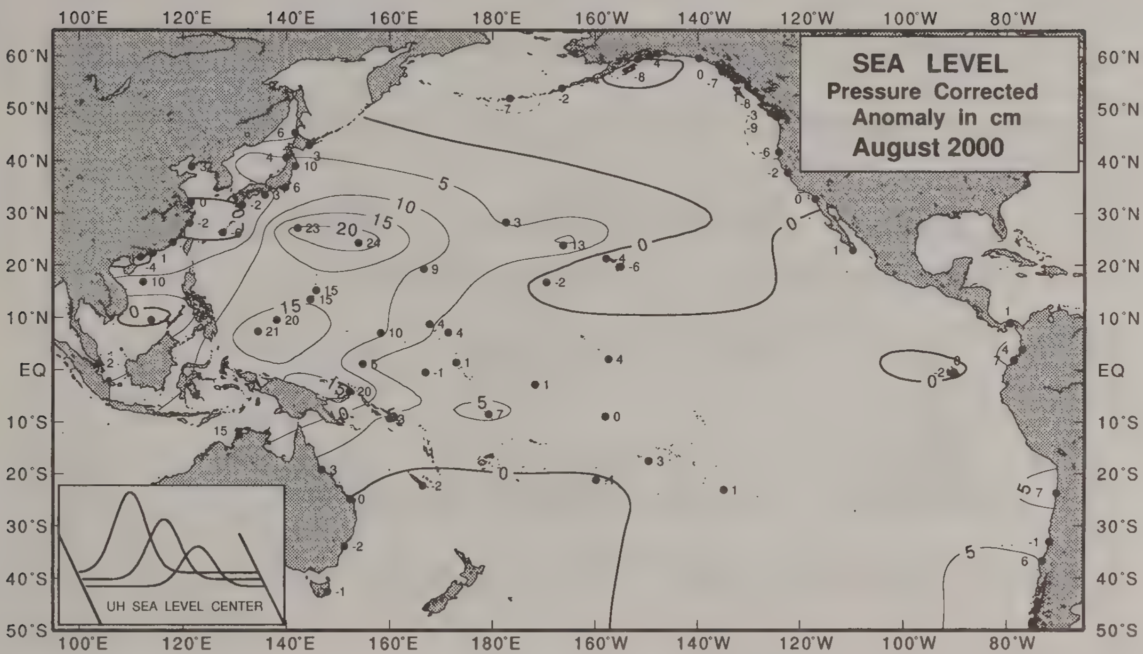
Fig. 20　Movements of drifting buoys in the Pacific Ocean during September 2000. Each track is for one buoy. Small circles represent the last positions for the month.

Depth-Longitude Sections of Equatorial Temperature & Anomalies



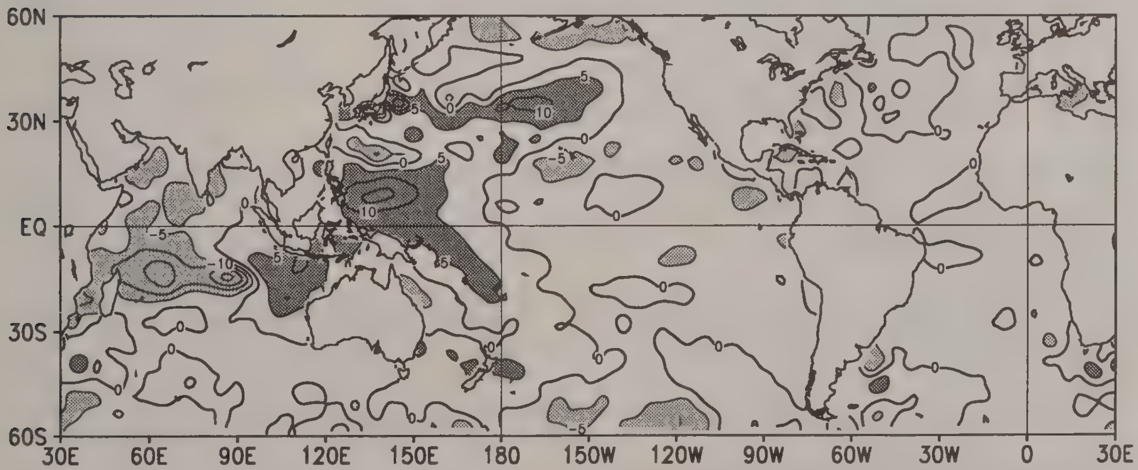
第21図　太平洋赤道に沿う表層水温（上）及び偏差（下）の深度－経度断面図（2000年 9月）

Fig.21　Depth-longitude sections of temperature (top) and anomalies (bottom) along the equator in the Pacific Ocean for SEP 2000.　Data are derived from the Ocean Data Assimilation System of JMA.　Contour interval is 1°C (top) and 0.5°C (bottom).　Values greater than 28°C in the top panel are shaded.　In the bottom panel, values greater than 1°C are shaded and values less than -1°C are spotted.　Anomalies are computed from 1987-1999 base period means.



第 22 図　太平洋月平均海面水位偏差図 （2000 年 8 月）

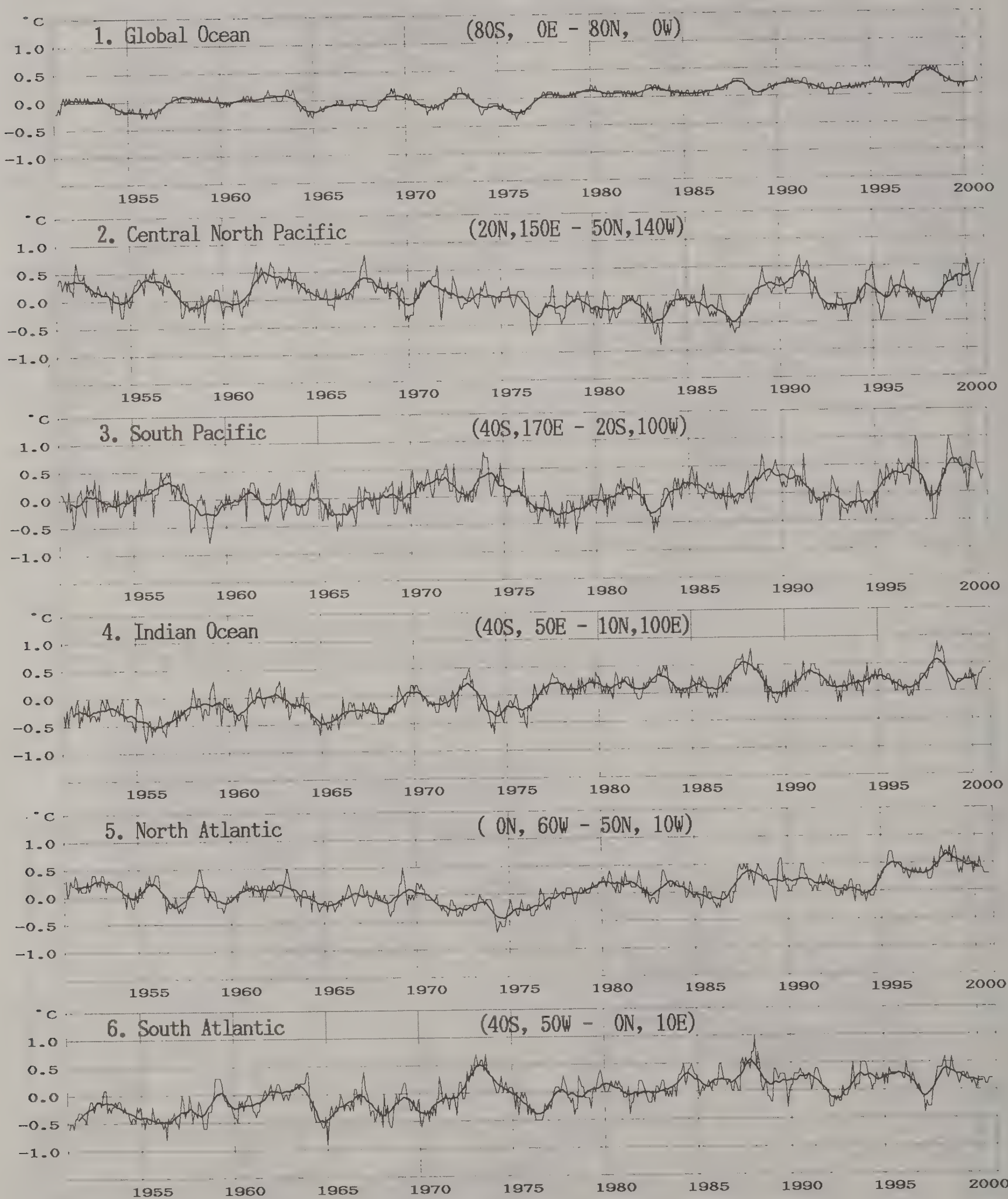
Fig. 22　Monthly sea level anomalies for August 2000 obtained from mean sea level (1975-1995) adjusted for atmospheric pressure. This figure is prepared by the SOC of ISLP-PAC, Department of Oceanography, University of Hawaii.



第 23 図　全球月平均海面高度偏差図 （2000 年 8 月）

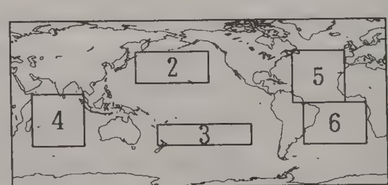
Fig. 23　Monthly sea surface height anomalies in the global ocean derived from the altimeter data of TOPEX/POSEIDON for August 2000. Contour interval is 5 cm. Positive anomalies exceeding +5 cm are shaded and negative anomalies exceeding -5 cm are spotted. Anomalies are computed from 1993-1998 base period means.

Long-term Variation of Monthly Mean SST Anomalies

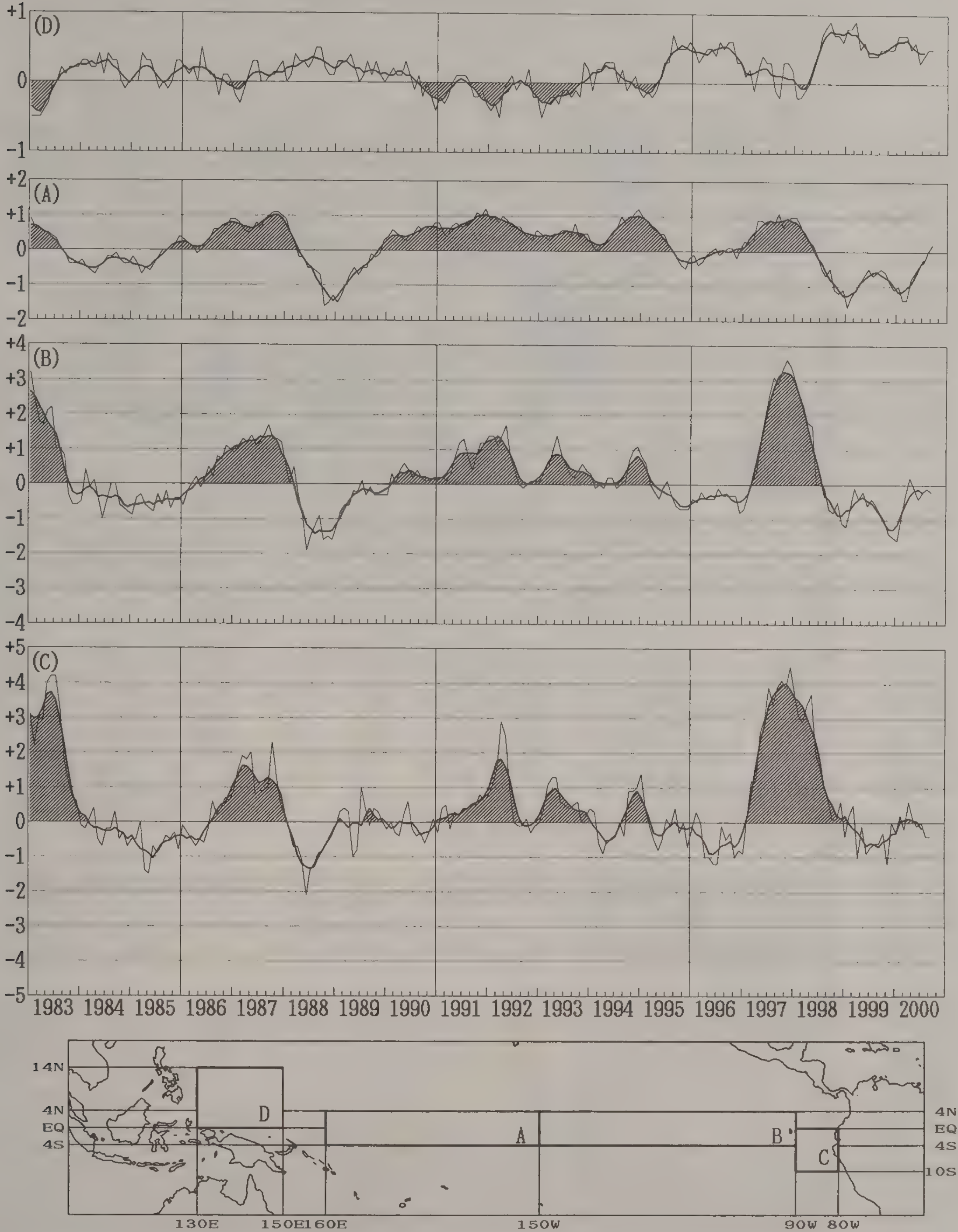


第24図 海域平均海面水温偏差の長期変動

Fig.24 Long-term variations of monthly mean sea surface temperature anomalies (°C) for the areas shown in the right panel. Anomalies are computed from the JMA climatology (1961-90). Thin lines show the monthly mean and thick lines their 13-month running means.



Time Series of Equatorial Pacific SST Anomalies



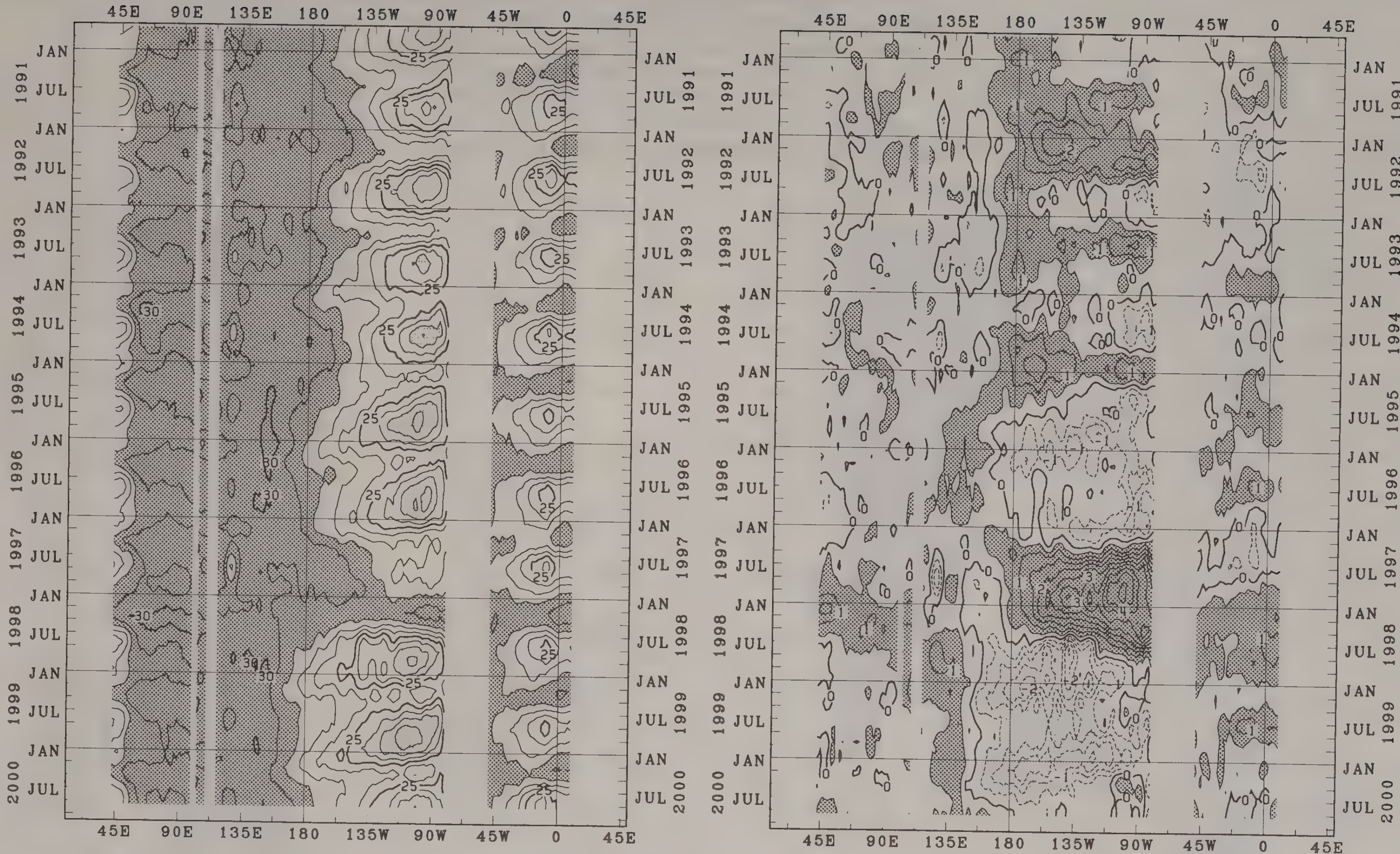
第25図　太平洋赤道域の海面水温偏差時系列図

Fig.25 Time series of monthly mean SST anomalies (°C) in the equatorial Pacific Ocean for the areas indicated at the bottom panel. Thin lines show the monthly means and thick lines their 5-month running means. Positive anomalies (A, B, C) and negative anomalies (D) are shaded. Anomalies are computed from the JMA climatology (1961-1990).

	SEA SURFACE TEMPERATURE AND ANOMALY (°C)								SOI	SEA LEVEL PRESSURE ANOMALY (hPa)	
MONTH YEAR	REGION D 14N-EQ 130E-150E		REGION A 4N-4S 160E-150W		REGION B 4N-4S 150W-90W		REGION C EQ-10S 90W-80W		SOI	TAHITI 17-33S 149-37W	DARWIN 12-24S 130-52E
JAN 98	28.3	-0.2	29.0	1.0	28.4	3.0	28.0	3.7	-2.3	-3.6	1.4
FEB 98	28.1	-0.2	28.8	0.8	28.8	2.6	28.8	3.1	-1.8	-0.9	3.5
MAR 98	28.3	-0.1	28.6	0.5	29.0	2.1	28.8	2.9	-2.5	-2.8	2.3
APR 98	28.8	0.0	28.5	0.3	28.9	1.8	28.5	3.4	-2.3	-1.5	1.4
MAY 98	29.3	0.2	28.7	0.2	28.3	1.7	27.6	3.7	0.0	0.4	0.5
JUN 98	29.7	0.4	28.4	-0.1	26.1	0.0	24.7	2.0	1.1	0.9	-0.5
JUL 98	29.9	0.7	28.0	-0.5	25.3	0.1	23.2	1.6	1.5	1.8	-0.6
AUG 98	29.9	0.8	27.7	-0.7	24.5	-0.1	21.7	1.1	1.0	1.4	-0.2
SEP 98	30.1	0.9	27.8	-0.5	23.9	-0.7	21.0	0.7	1.0	1.4	-0.4
OCT 98	30.0	0.7	27.3	-1.1	23.8	-0.8	20.8	0.1	1.2	0.8	-1.1
NOV 98	29.9	0.7	27.2	-1.2	24.1	-0.5	21.6	0.1	1.0	0.4	-1.5
DEC 98	29.5	0.6	27.1	-1.1	23.8	-1.1	23.2	0.6	1.5	1.1	-1.5
JAN 99	29.3	0.8	26.4	-1.6	24.2	-1.2	23.9	-0.4	1.5	1.8	-1.5
FEB 99	29.1	0.8	26.7	-1.3	25.5	-0.7	25.9	0.2	0.8	1.3	-0.6
MAR 99	29.3	0.9	27.0	-1.1	26.8	-0.1	26.4	0.5	0.8	0.4	-1.3
APR 99	29.3	0.5	27.3	-0.9	26.7	-0.4	24.1	-1.0	1.8	1.3	-0.9
MAY 99	29.7	0.6	27.8	-0.7	26.4	-0.2	23.8	-0.1	0.3	1.1	1.1
JUN 99	29.7	0.4	28.0	-0.5	25.5	-0.6	21.8	-0.9	0.1	0.6	0.4
JUL 99	29.6	0.4	27.8	-0.7	24.8	-0.4	20.9	-0.7	0.5	1.0	0.1
AUG 99	29.5	0.4	27.8	-0.6	24.0	-0.6	20.0	-0.6	0.0	1.3	1.1
SEP 99	29.7	0.5	27.8	-0.5	23.8	-0.8	19.7	-0.6	-0.1	0.2	0.4
OCT 99	29.8	0.5	27.8	-0.6	23.6	-1.0	20.4	-0.3	1.1	1.2	-0.4
NOV 99	29.7	0.5	27.5	-0.9	23.2	-1.4	20.3	-1.2	1.1	1.2	-0.9
DEC 99	29.4	0.5	27.1	-1.1	23.4	-1.5	22.6	0.0	1.5	1.9	-0.9
JAN 00	29.2	0.7	27.0	-1.0	23.8	-1.6	24.0	-0.3	0.4	1.3	0.3
FEB 00	29.0	0.7	26.6	-1.4	25.3	-0.9	25.9	0.2	1.1	2.6	-0.2
MAR 00	29.1	0.7	26.7	-1.4	26.6	-0.3	25.7	-0.2	1.0	1.6	-0.3
APR 00	29.3	0.5	27.4	-0.8	27.3	0.2	25.7	0.6	1.4	0.8	-1.0
MAY 00	29.7	0.6	27.9	-0.6	26.5	-0.1	24.0	0.1	0.3	0.8	0.7
JUN 00	29.6	0.3	28.1	-0.4	25.7	-0.4	22.6	-0.1	-0.6	0.2	0.9
JUL 00	29.6	0.4	28.2	-0.3	25.0	-0.2	21.6	0.0	-0.3	-0.4	0.0
AUG 00	29.6	0.5	28.4	0.0	24.5	-0.1	20.2	-0.4	0.5	0.2	-0.6
SEP 00	29.7	0.5	28.5	0.2	24.4	-0.2	19.9	-0.4	0.9	1.6	-0.0

第1表　エルニーニョ監視指数

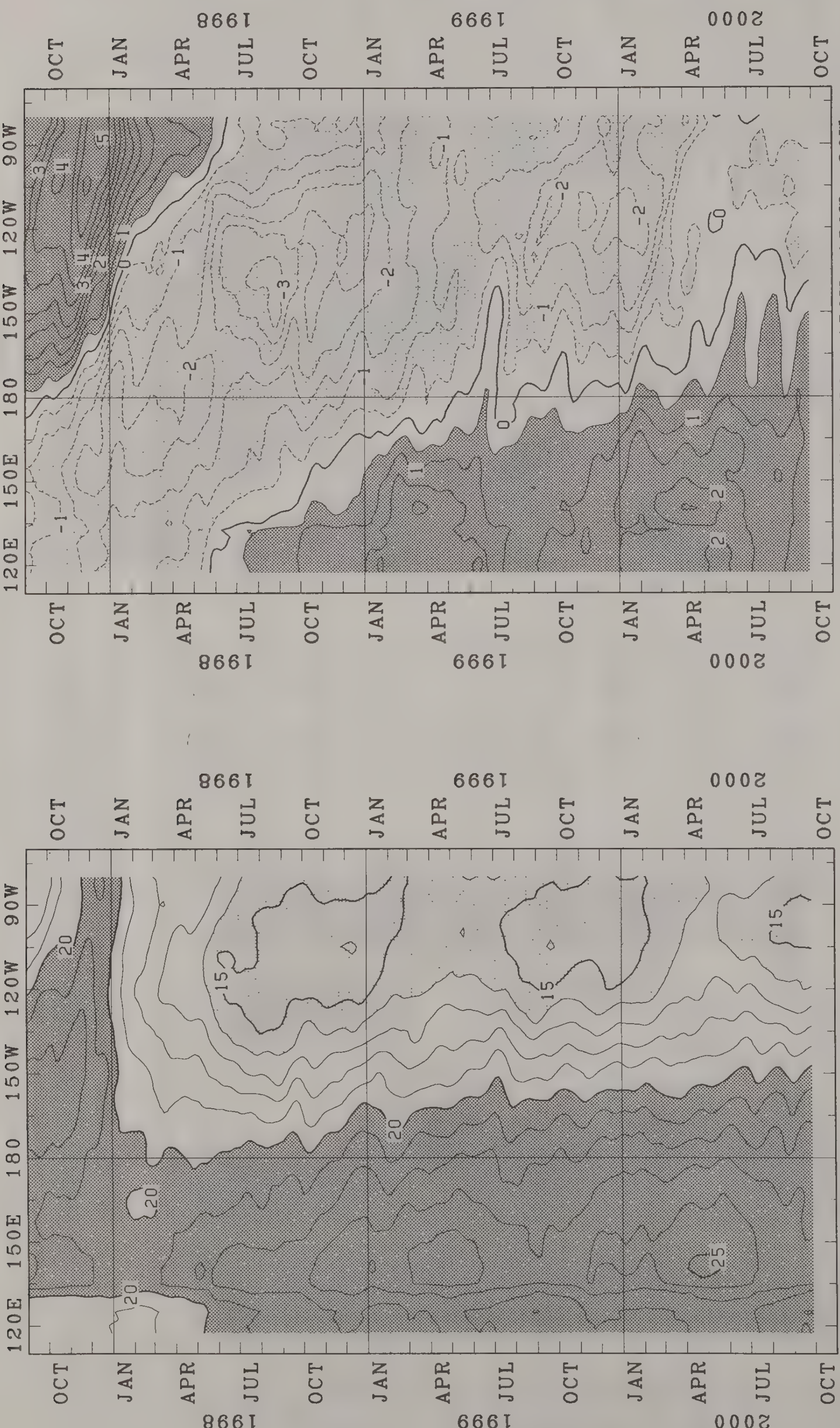
Table 1 El Nino Monitoring indices



第 26 図　赤道に沿った海面水温（左）及び偏差（右）の時間-経度断面図

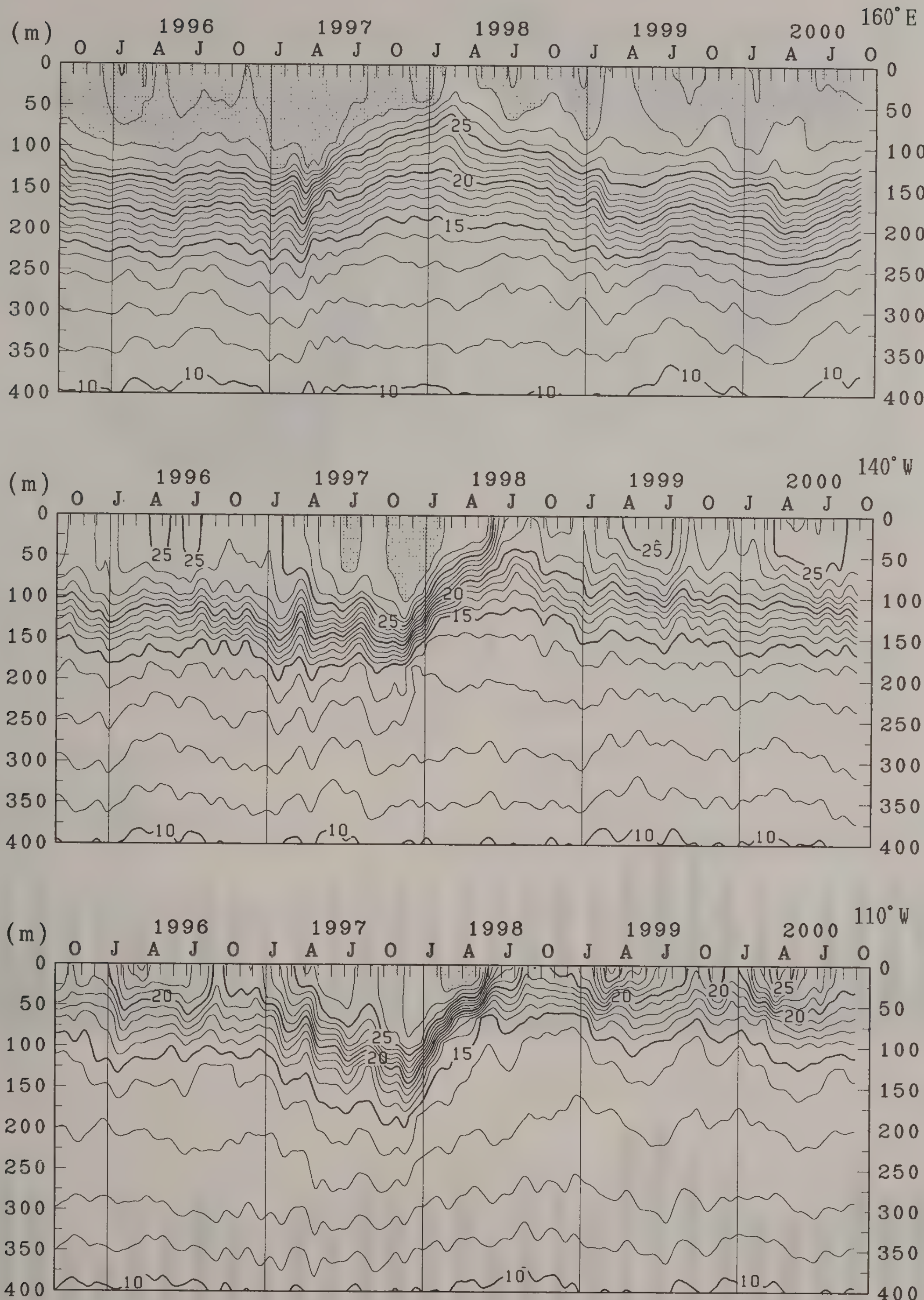
Fig. 26　Time-longitude sections of SSTs (left) and anomalies (right) along the equator (2 °N-2 °S) in the global ocean. Contour interval is 1 °C (left) and 0.5 °C (right). Values greater than 28 °C are shaded and values less than 23 °C are spotted in the left panel. Dashed contours indicate negative anomalies in the right panel. Anomalies are computed from 1961-1990 base period means.

Time-Longitude Sections of Ocean Heat Content & Anomalies (Eq.)



第27図　太平洋の赤道に沿う海洋表層の貯熱量（左）及び偏差（右）の時間－経度断面図

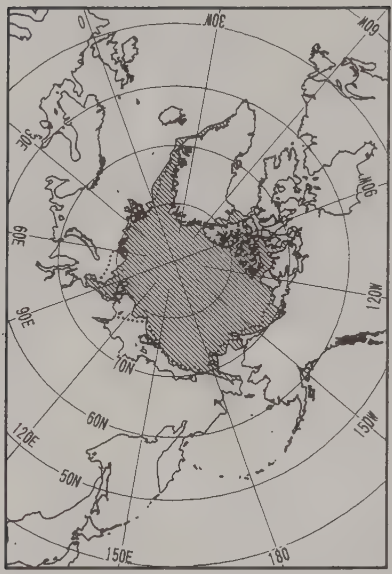
Fig.27 Time-longitude sections of ocean heat content in the upper 260 m along the equator (left) and anomalies (right) in the Pacific Ocean. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (left) and 0.5°C (right). Values greater than 20°C are shaded and values less than 16°C are spotted in the left panel. Dashed contours indicate negative anomalies in the right panel. Anomalies are computed from 1987-1999 base period means.



第28図　太平洋赤道域の表層水温の時間－深度断面図

（上：西部、中：中部、下：東部）

Fig.28 Time-depth sections of equatorial subsurface temperature for the western Pacific (top, 160°E), the central Pacific (middle, 140°W) and the eastern Pacific (bottom, 110°W). Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C. Values greater than 28°C are shaded.

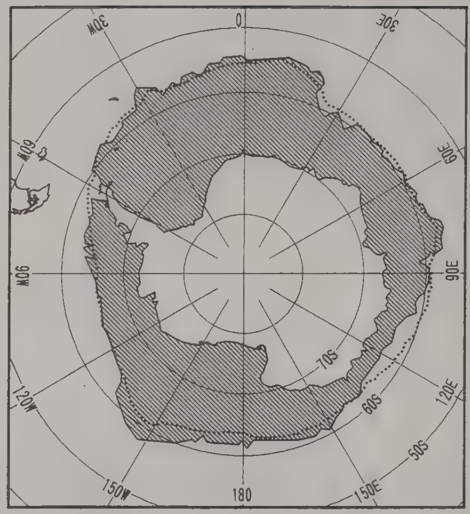


第29-1図　北極域の海氷図（2000年 9月15日）

Fig.29-1 Sea ice chart in the Arctic on 15 Sept. 2000.

The shaded area represents the sea ice extent. The dotted line denotes the mean ice edge averaged for the period from 1972 through 1990.

The data source is the National Ice Center (USA).

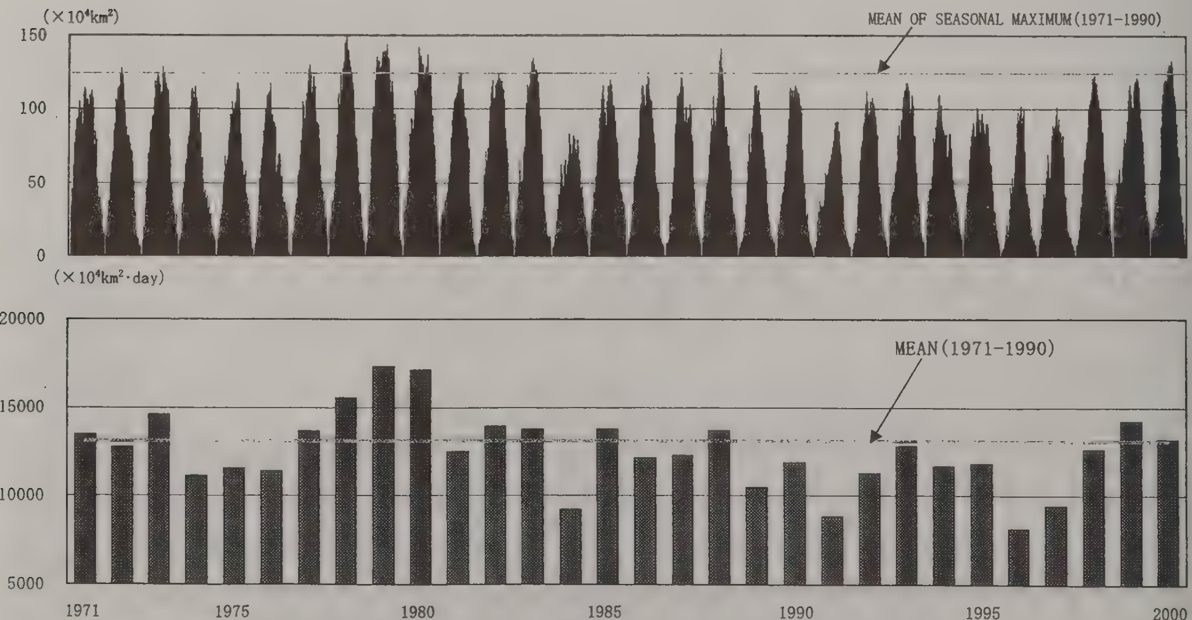


第29-2図　南極域の海氷図（2000年 9月15日）

Fig.29-2 Sea ice chart in the Antarctic on 15 Sept. 2000.

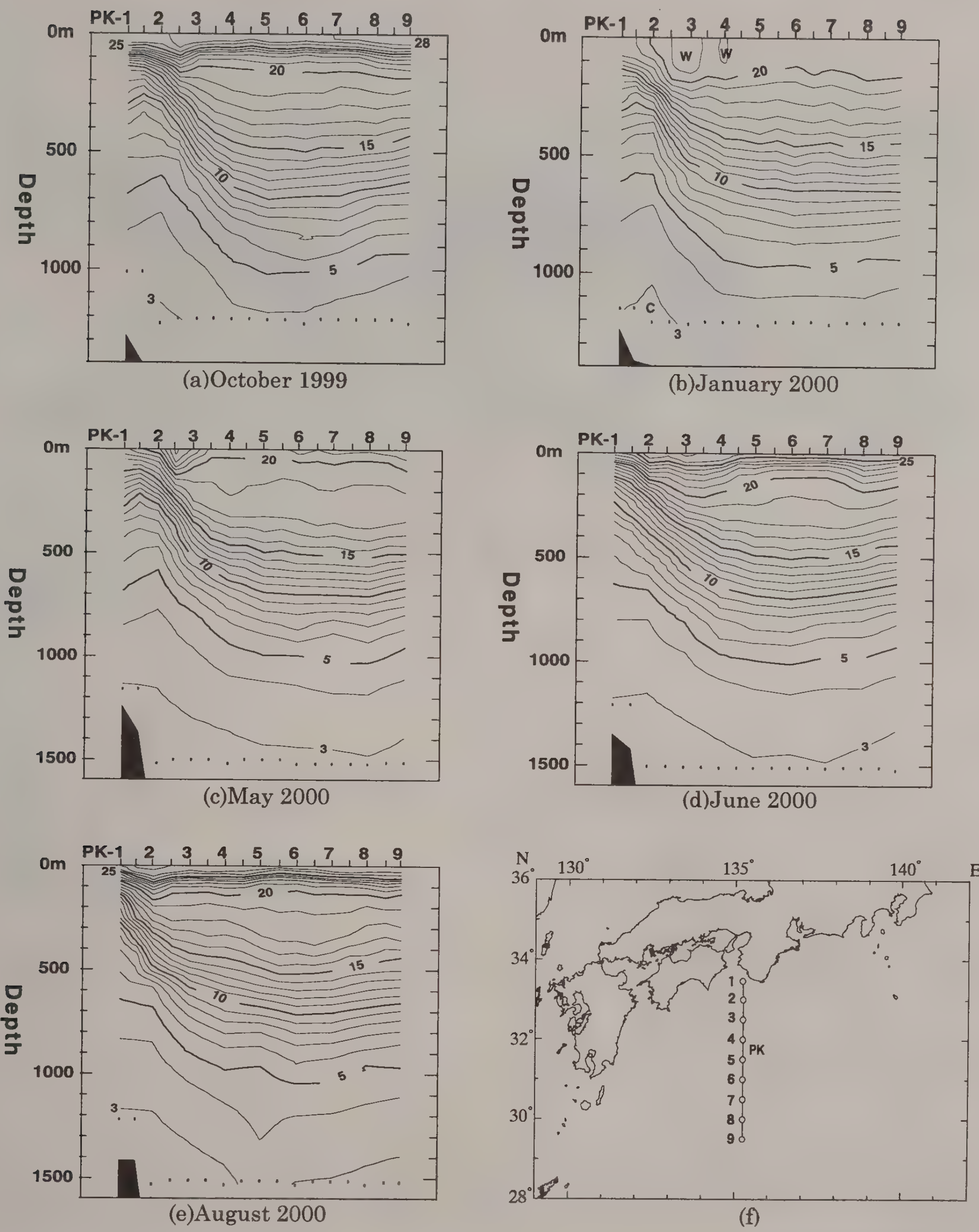
The shaded area represents the sea ice extent. The dotted line denotes the mean ice edge averaged for the period from 1973 through 1990.

The data source is the National Ice Center (USA).



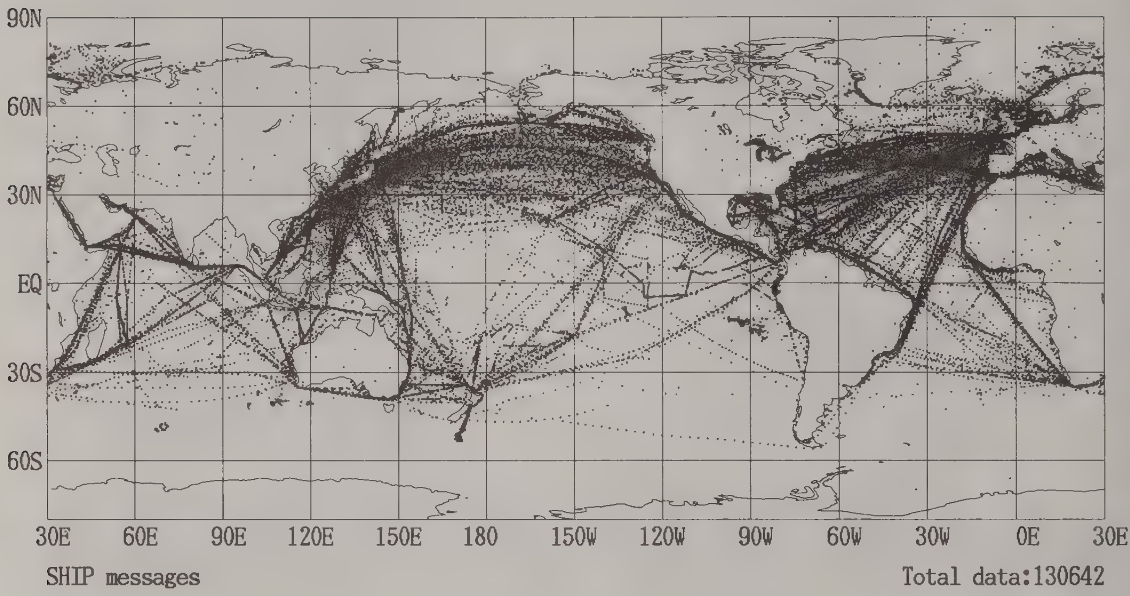
第29-3図 オホーツク海の海氷期の半旬海氷域面積（上段）とその積算（下段）の経年変化

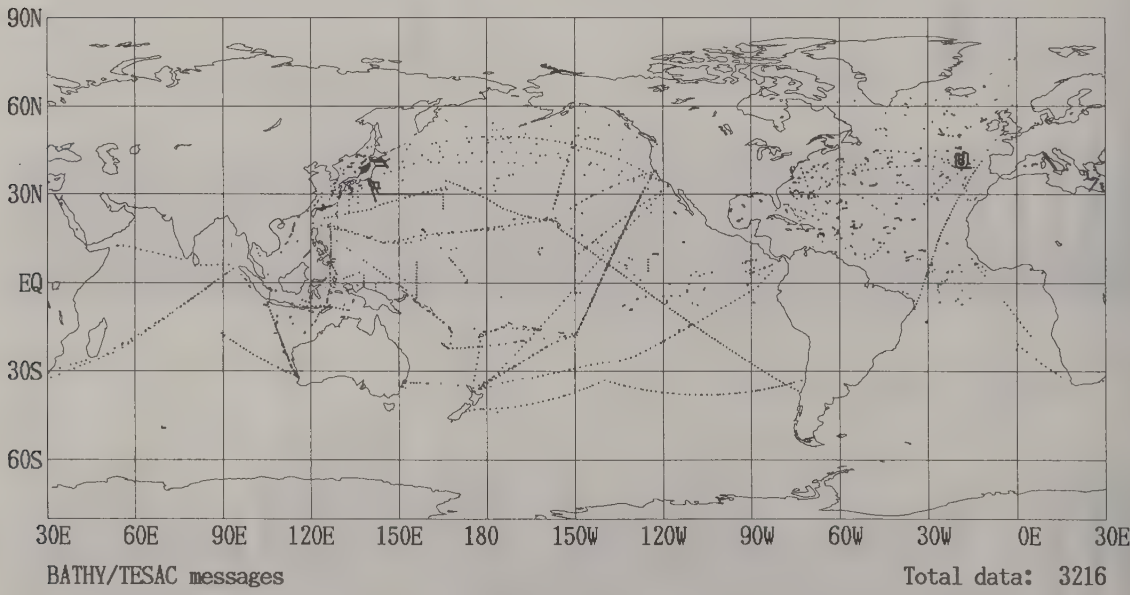
Fig.29-3 Time series of 5-day sea ice extent from December to May (upper) and its accumulation (lower) in the Sea of Okhotsk



第30図 神戸海洋気象台春風丸によるPK線に沿った水温鉛直断面図. (a)1999年10月, (b)2000年1月, (c)2000年5月, (d)2000年6月, (e)2000年8月, (f)PK線の位置図.

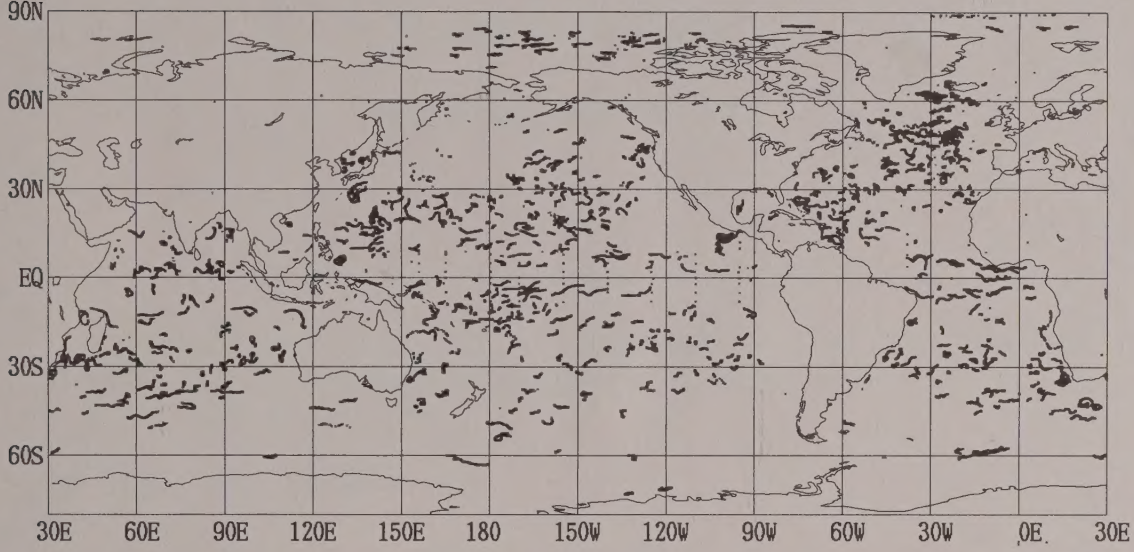
Fig. 30 Vertical sections of temperature (℃) along the PK line observed by R/V Shumpu Maru of Kobe Marine Observatory of the Japan Meteorological Agency. (a)October 1999, (b)January 2000, (c)May 2000, (d)June 2000, (e)August 2000, (f)Location of the PK line.



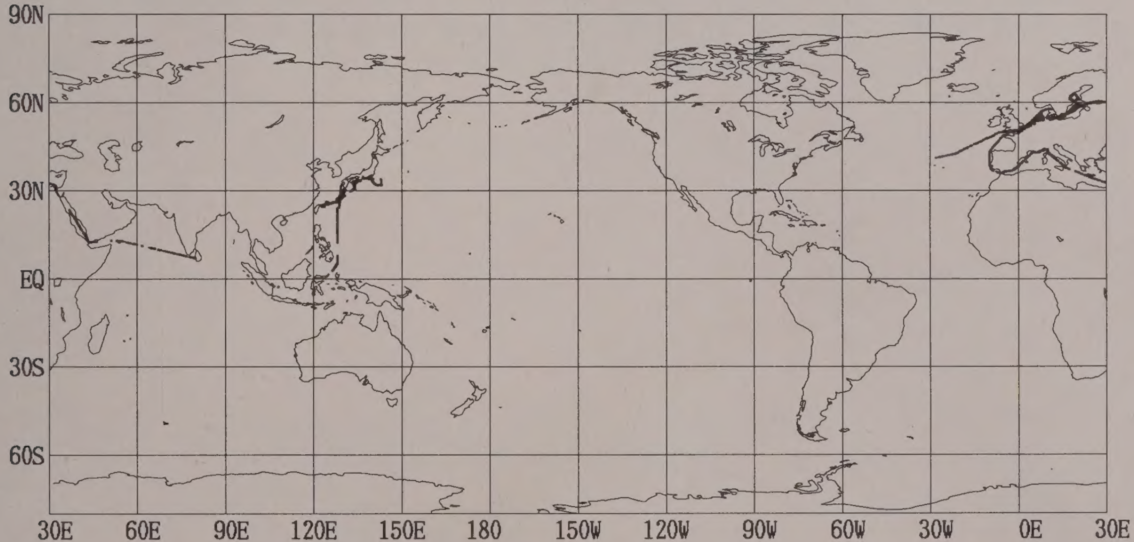


第31-1図　測点分布図(2000年 9月)

Fig.31-1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for SEP 2000.



BUOY messages Total data:306345



TRACKOB messages Total data: 1798

第31-2図 測点分布図(2000年 9月)

Fig.31-2 Geographical distribution of BUOY messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for SEP 2000.

気象庁海洋月報

Monthly Ocean Report

September 2000 (No. 93)

本月報掲載の 2000 年 9 月のプロダクトには、気象庁が観測したデータ及び GTS（全球気象通信網）を通じて入手した国際気象通報式による通報のほか、下記の機関等から提供いただいたデータを使用しています。御礼申し上げます。

防衛庁、水産庁、海上保安庁

海洋科学技術センター、（社）漁業情報サービスセンター

東北大学、東京大学、鹿児島大学

水産試験場等（北海道、青森県、岩手県、宮城県、秋田県、山形県、福島県、茨城県、千葉県、東京都、新潟県、富山県、石川県、静岡県、愛知県、三重県、兵庫県、和歌山県、鳥取県、島根県、山口県、福岡県、佐賀県、宮崎県）

（順不同）

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